# The OIL WEEKLY

10¢ A COPY

*Exclusively Devoted To The Production and Transportation of Oil and Gas*

Engineering News Statistics

March 14, 1930 Volume 56, No. 13

This picture shows the Wirt Franklin Petroleum Corporation's No. 2 Lowry Well, Oklahoma City—one of the most productive wells in that field.

*The Hughes Valves and Fittings on this Hook-up are:*

2—6⅝" A.P.I. Flanged End 5000 lb. Test Valves
2—6⅝" A.P.I. Flanged End 3000 lb. Test Valves
2—4", 8 thread, 3000 lb. test, Manifold Valves
1—6⅝" x 6⅝" 3000 lb. test Type "X" Cross
1—6⅝" x 4", 8 thread. 3000 lb. test, Type "Z" Cross

Rock Pressure when well was shut in was approximately 2200 lbs. There was not a leak.

**HUGHES TOOL COMPANY, Main Office and Plant, Houston, Texas**

# He Closed a sale for 10 carloads of flour by Telephone

THE SALES MANAGER of a Columbus, Ohio, flour company placed a telephone call to a customer in Roanoke, Virginia. In less than four minutes he sold ten carloads of flour valued at $17,500. Cost of call, $2.10. In one month the telephone expenditure for the company was $65 and brought in orders for approximately $300,000 worth of flour.

Telephone calls between distant cities are increasing sales for all types of concerns. A coal wholesaler of Abilene, Kansas, sells 90% of his tonnage by telephone, and increases his sales each year. During the spring storage-taking period, he reaches out by telephone and sells from twenty to one hundred carloads of coal a day.

Business by telephone is the growing economy today. A Decker, Indiana, fruit company distributes 80% of its volume by telephone. An oil company of New York, Pennsylvania and Ohio does 95% of its annual business—$3,000,000—over the telephone.

What percentage could you add to your business by telephone contacts? Ask your local Bell Business Office to help you survey your needs. You may be overlooking telephone opportunities for increased business. Bell Telephone Service is . . . *Convenient . . . Economical . . . Universal.*

AMERICAN TELEPHONE & TELEGRAPH CO. AND ASSOCIATED COMPANIES — BELL SYSTEM

ANOTHER MANUFACTURER FOR THE OIL INDUSTRY THAT USES SKF BEARINGS

## E. J. LONGYEAR MANUFACTURING COMPANY

## SKF THROUGHOUT . . . THAT'S HOW LONGYEAR GIVES FULL PROTECTION

OPERATED in remote places where avoiding shutdowns means everything, Longyear makes certain that these drills will have the necessary sturdiness and dependability . . . by using SKF Ball Bearings. Important considerations to the men on the job and fully met by the Longyear policy of building "no come-backs" into their equipment rather than any small savings on integral parts.

At eighteen points . . . on all shafts . . . SKF Bearings give the necessary protection under the hardest demands which can be placed on this equipment. Despite shocks and strains, SKF Bearings keep running along smoothly and easily, protecting and prolonging the life of machinery. Dust, dirt or changes in the weather cannot affect these bearings either, for sealed housings furnish ample protection and reduce re-lubrication to a small job two or three times a year.

**SKF INDUSTRIES, INC., 40 East 34th Street, New York, N. Y.**

2475

EQUIPPED WITH THE HIGHEST PRICED BEARING IN THE WORLD

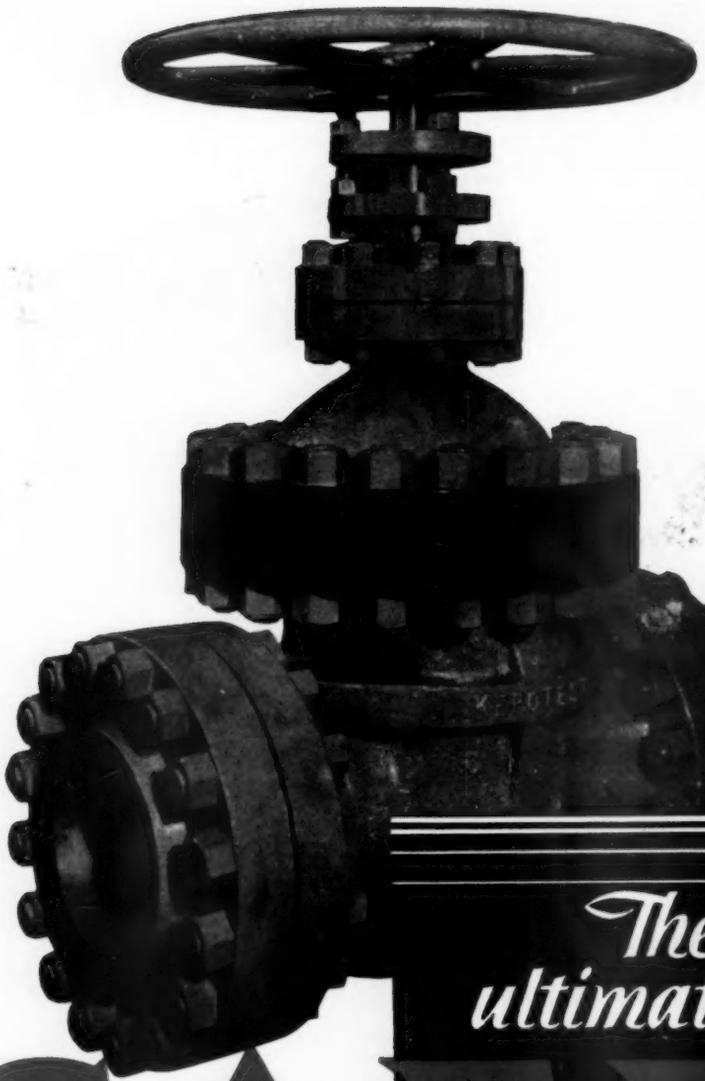
*Means just this*

SKF

*Ball and Roller Bearings*

*That the manufacturers whose product is illustrated above preferred to pay more for their bearings and less for servicing or replacing them. They preferred to pay a higher price in the beginning than many times this higher price in the end. And, finally, they preferred to economize by using SKF bearings because they are made to do their job, not to fit a price list.*

The OIL WEEKLY. Issued weekly by the Gulf Publishing Co., 3301 Buffalo Drive, Houston, Texas. Subscription price $1.00 per year; 15 cents per copy. Entered as second-class mail matter December 23, 1916, at the post office at Houston, Texas, under act of March 3, 1879.



*The ultimate in*

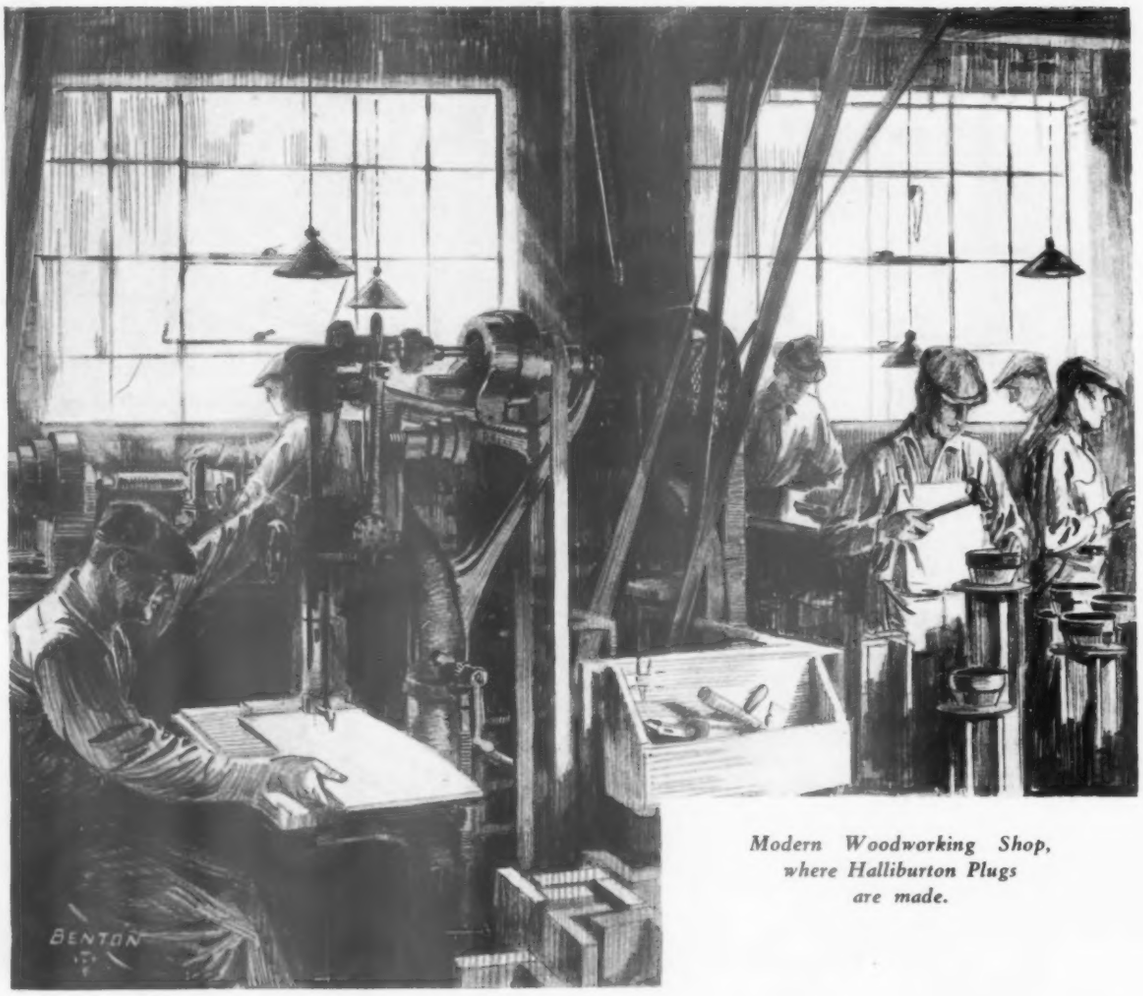
# SAFETY

*and dependability*

*Carried in Stock and Sold by*
NORVELL-WILDER COMPANY
Houston, Beaumont, Shreveport, Fort Worth
OIL WELL SUPPLY COMPANY
Branch Stores in all Oil Fields

*Export Distributors*
OIL WELL SUPPLY COMPANY
Pittsburgh, New York, Tampico, London

KERO TEST
REGISTERED U. S. PAT. OFF.
PITTSBURGH




*Modern Woodworking Shop, where Halliburton Plugs are made.*

In the Halliburton process there are no "minor matters." The smallest piece of equipment, the tiniest detail of procedure, is constantly being subjected to the searching inquiry of research and experiment. . . . Cementing plugs, for example, seem simple enough—yet even their design and construction are the result, not of chance, but of exhaustive study and test. . . . Halliburton is a scientific organization, rendering a scientific service to the industry.

# HALLIBURTON

**OIL WELL CEMENTING CO.**

***Duncan, Oklahoma***

***THE CEMENTER—containing news of the industry, information on cementing developments and a dash of humor—will be mailed to you regularly as issued if you will fill in and mail the coupon.***

Halliburton Oil Well Cementing Co.,
Dept. OW, Duncan, Okla.

Without cost or obligation, please place my name on the list to receive THE CEMENTER regularly as issued.

Name .....

Company .....

Address .....

# Think of the Purchase Cost as Rent for the Valve's Life-

## *Darling Valves cost the least per year ~ ~ ~*

You pay more for the Darling valve than you do for others—granted. But—certainly it is performance over a long period of time that you want. If you divide the great number of years of service in the Darling Valves by their cost you will find the Darling Valve gives you the best performance at a decidedly lower yearly expense.

**DARLING VALVE & MFG. CO.**
Williamsport, Pa.

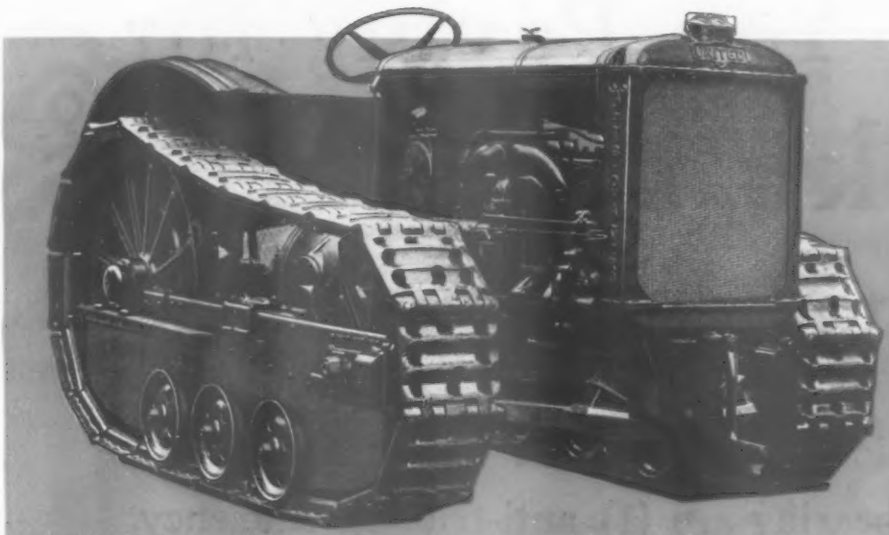
New York Chicago Oklahoma City Houston

*Mid-Continent Distributors:*
Frick-Reid Supply Corp. International Supply Co.
Petroleum Supply Co.

*California Distributor*
Petroleum Equipment Company, Los Angeles

*Foreign Sales Manager:*
H. M. Hein, Room 1405, 152 West 42nd Street, New York

# DARLING GATE VALVES



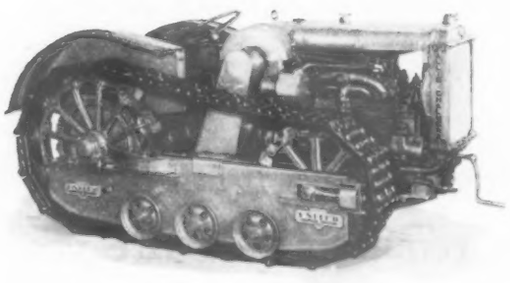
The United Crawler Tractor provides sure-footed power and speed for pipe handling and laying, hauling equipment, snaking trucks and a multitude of other oil field operations. Design permits easy attachment of booms and winches. A joint product of Allis-Chalmers and Trackson Co.

# SAVE TIME - MEN - MONEY

**On oil field and pipe line work. Cut operating costs and increase your profits with Allis-Chalmers powered United Equipment. Get the facts about United Industrial Tractors and the complete line of United Equipment designed for your particular needs.**

**Write for details and name of your nearest United Distributor**

The United Chief Hoist mounted on the United Tractor provides an unusually strong and serviceable unit for oil field work. Has large capacity cable drum, three-speed forward and three-speed reverse drives. Friction type cone clutch, large full floating double brakes. Hoist is operated and fully controlled from driver's seat. Designed and built by Automotive Division, Muskogee Iron Works.



The United Arc Welder is a step ahead in fully portable tractor-driven welders for pipe line work. In this combination the well-known Hansen welder is actually built into the United Tractor in such a way as not to interfere with the use of the tractor for other work. Built by Northwestern Mfg. Co.

## UNITED TRACTOR & EQUIPMENT CORP.

612 NO. MICHIGAN AVE. CHICAGO, ILLINOIS.

UNITED TRACTORS & EQUIPMENT

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NORTHWESTERN MFG. CO.
PERRY COMPANY
SCHRAMM, INC.
THE HUGHES-KEENAN CO
TRACKSON COMPANY
WEHR COMPANY

# Are You Paying for Timken Bearings Without Getting Them?

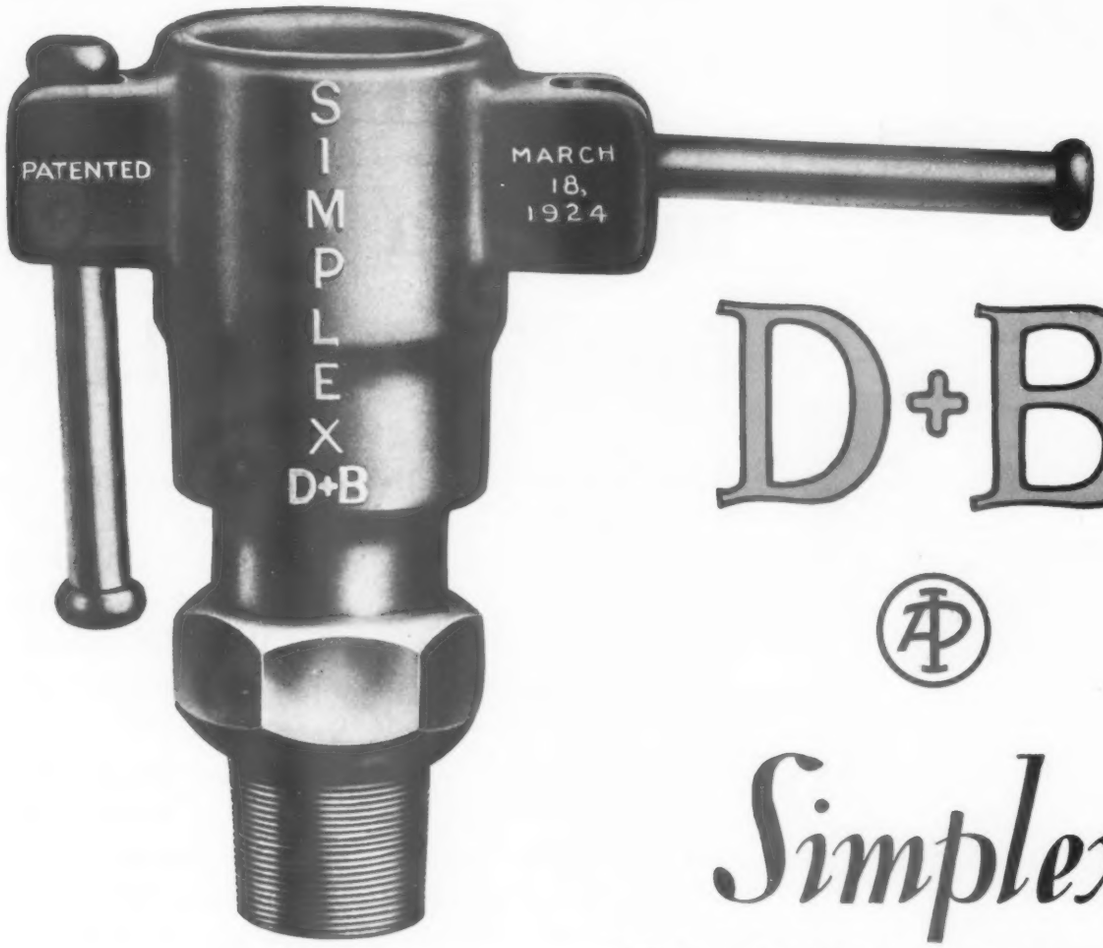
The basic requirements of an efficient anti-friction bearing are (1) anti-friction efficiency, (2) maximum radial capacity in the smallest unit of space, (3) thrust capacity without sacrificing the principle of design, (4) combined radial and thrust capacity, (5) take-up to facilitate assembly and compensate for wear.

In buying anti-friction bearings you pay for every one of these qualities, and you have a right to expect and demand every one of them. For anything short of that does not give you the anti-friction advantages required in your product.

The Timken Tapered Roller Bearing is the *only* anti-friction bearing that meets *all* of these requirements. Are you getting full value for your anti-friction money—or are you *paying* for Timken Bearing advantages without getting them?

THE TIMKEN ROLLER BEARING COMPANY, CANTON, OHIO

TIMKEN *Tapered Roller* BEARINGS




# D+B

# *Simplex* STUFFING BOX

*"If Continental Sells It . . . . There Is No Better"*

**THE CONTINENTAL SUPPLY COMPANY**
General Offices: ST. LOUIS

THE CONTINENTAL SUPPLY CO., LTD.
224 Traders Building, Calgary, Alberta, Canada

Export Offices: CONTINENTAL EMSCO COMPANY, INC. 74 Trinity Place New York
London Offices: 316-17 Dashwood House, Old Broad St. E. C. 2

# CONTINENTAL

# Pipe that meets a definite quality standard

**The purchaser of Bethlehem Steel Pipe is assured of a product that conforms in every respect to a definite and long-established standard of quality—the standard to which this Company has been working throughout more than half a century devoted to the manufacture of steel and steel products.**

**From the mining of the ore, through the finishing operations, the manufacture of Bethlehem Steel Pipe is controlled by one organization. Each step in the conversion of the steel into pipe is carried out under the supervision of thoroughly experienced men. The tests and inspections are most critical, so as to make certain that each length of pipe shipped conforms in every way to the Bethlehem standard of quality.**

**Bethlehem Steel Pipe is quality pipe. Pipe that meets every requirement and passes every test.**

**Make it a point to see the exhibit of Bethlehem Steel Company and Pacific Coast Steel Corporation in Booths 137 and 139 at the Oil Equipment and Engineering Exposition, Los Angeles, March 16th to 23rd.**

BETHLEHEM STEEL COMPANY

*General Offices:* Bethlehem, Pa.

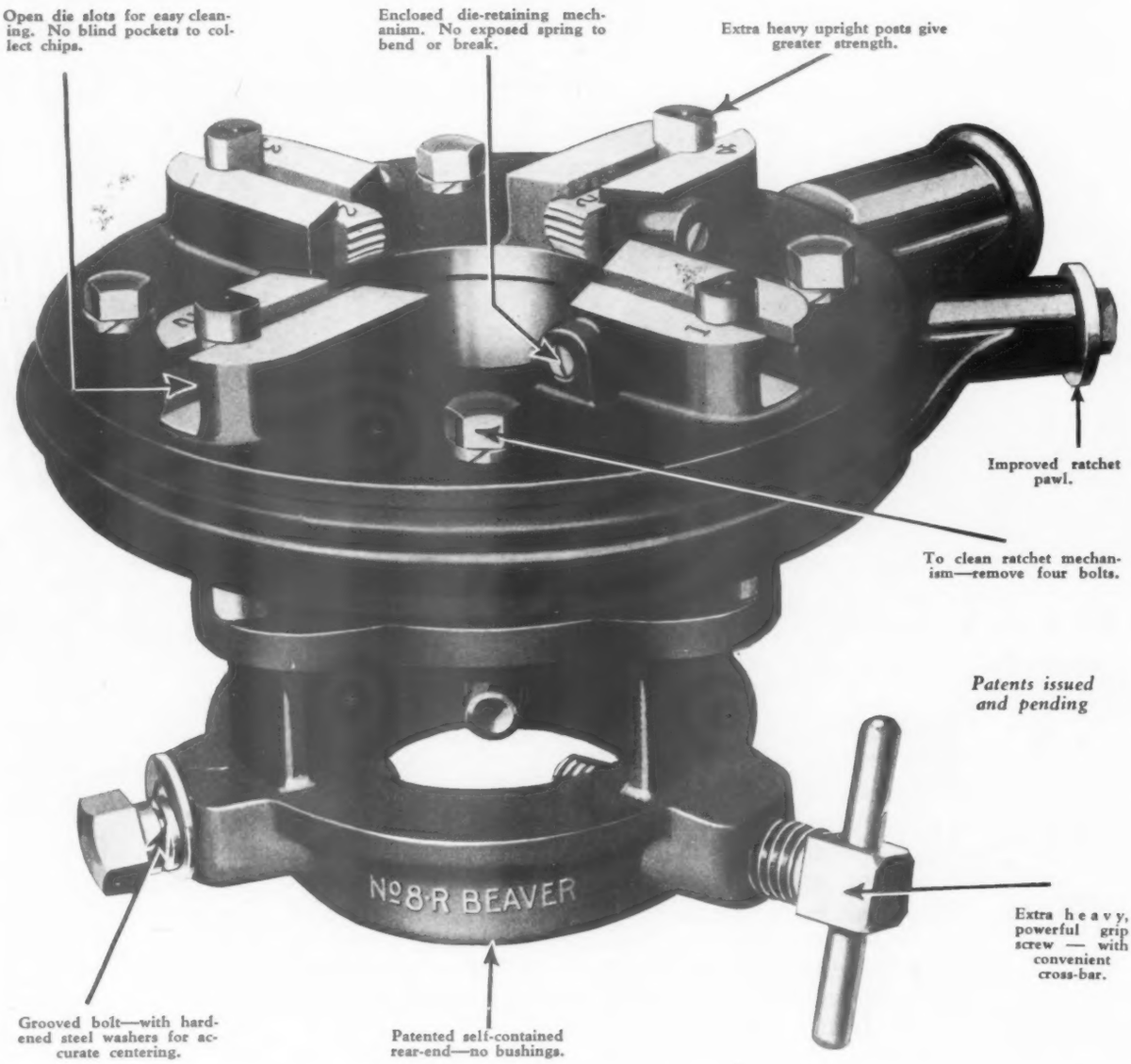
*District Offices:* New York, Boston, Philadelphia, Baltimore, Washington, Atlanta, Pittsburgh, Buffalo, Cleveland, Detroit, Cincinnati, Chicago, St. Louis.

*Pacific Coast Distributor:* Pacific Coast Steel Corporation, San Francisco, Los Angeles, Portland, Seattle, Honolulu.

*Export Distributor:* Bethlehem Steel Export Corporation, 25 Broadway, New York City.

# BETHLEHEM STEEL PIPE

# The new BEAVER 1 to 2 in. "four-poster"


Open die slots for easy cleaning. No blind pockets to collect chips.
Enclosed die-retaining mechanism. No exposed spring to bend or break.
Extra heavy upright posts give greater strength.
Improved ratchet pawl.
To clean ratchet mechanism—remove four bolts.
Patents issued and pending
Extra heavy, powerful grip screw — with convenient cross-bar.
Grooved bolt—with hardened steel washers for accurate centering.
Patented self-contained rear-end—no bushings.
No 8-R BEAVER

Lightest in weight — yet strongest!
These tools will save you money!
Get your order in early to avoid disappointment.

**Coming**

**The Beaver**
**Power Pipe Machine**
**(½ to 2″)**

*Wait 'till you see it.*

THE BORDEN CO., 520 Dana Ave., Warren, Ohio, U. S. A.

☐ Send me catalog and full information.

☐ Send me ..... No. 8 (plain) ..... No. 8R (ratchet)

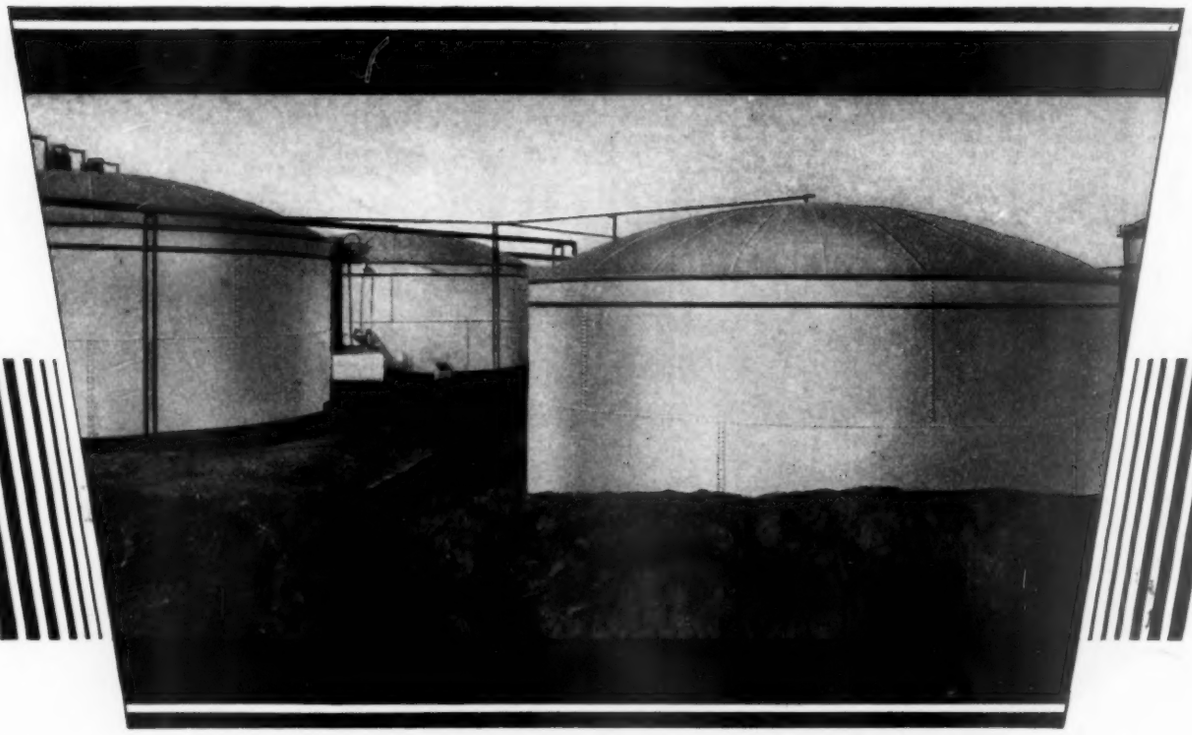
Bill through (Jobber) .....

Name ..... Position .....

Firm .....

Street ..... City ..... State .....

THIS COAT OF METAL PROTECTION



Prevents Corrosion—Defies Even the Attack of Hydrogen Sulphide Fumes

All paints have two major components—pigment and vehicle. Good paint jobs depend upon the proper selection of both.

The pigment of aluminum paint is actually metal—minute flat flakes of pure Alcoa Aluminum. And aluminum is one metal that serves best in the oil field. It *cannot* rust, it resists corrosion, and the attacks of hydrogen sulphide gas leave it unscathed.

This paint brings a new kind of protection—a coat of metal protection—for oil tanks and other exposed metal structures. When it is applied, aluminum paint "leafs". The minute flakes of Alcoa Aluminum build up in layers, forming a tough, long-lasting protective paint coat.

In time, any paint film will need renewing. But aluminum paint, made with Alcoa Albron Powder, out-wears, out-lasts ordinary paints. It costs no more than other kinds of good paint.

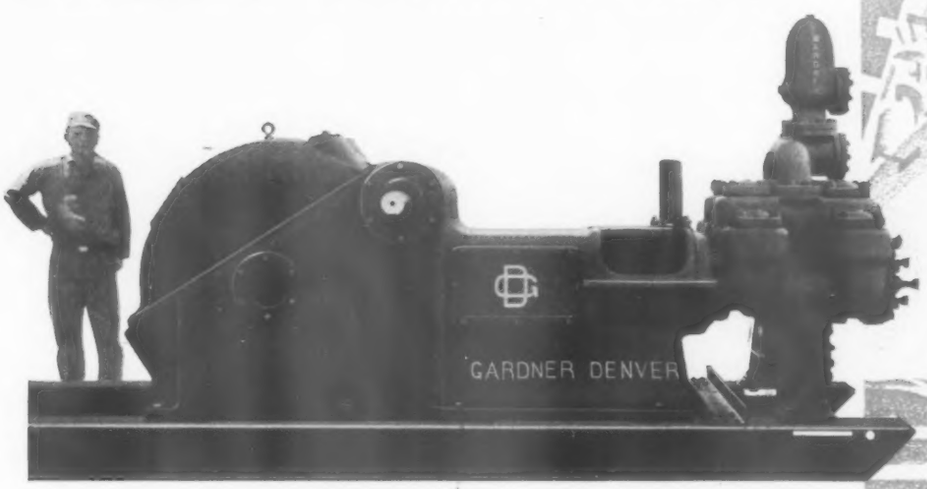
May we send you a free copy of "Aluminum Paint, the Coat of Metal Protection"? It fully describes the many protective uses of aluminum paint. ALUMINUM COMPANY *of* AMERICA; 2419 Oliver Building, PITTSBURGH, PENNSYLVANIA. Offices in 19 Principal American Cities.

ALCOA ALBRON
POWDER FOR
ALUMINUM PAINT

ALCOA

# STRONG AS A BATTLESHIP!

## *THE NEW*
## GARDNER-DENVER
## 7½ x 16
## POWER SLUSH PUMP



1. Conservatively Built for 200 H. P. Motor Drive » »
2. Rugged Cradle Prevents Weaving » » » » » »
3. Extra Sturdy Steel Eccentrics and Eccentric Rods » »
4. Roller Bearing Pinion and Main Shaft » » » » »
5. Proven Mud End » » » » » » » » » »

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J530

# CONTINENTAL

# FOR OIL TRANSPORTATION

Many companies for many years have standardized on Westcott Valves for oil transportation. They are recognized for their dependability for pipe line service—and are made in every standard size and working pressure for this service.

Discharge Gate Valve

Suction Gate Valve

# WESTCOTT VALVES

Manufactured by the Westcott Valve Company
East St. Louis, Ill.

Manufacturers of products for the Oil and Gas industries exclusively.
Full stocks carried in East St. Louis and all stores of the
Continental Supply Company

# WRIGHT

## HOISTS-TROLLEYS-CRANES

*21 points of superiority*

## No. 3-Steel Load Hook

—drop forged, heat treated and proof tested.

—swivels on Timken thrust bearing, which permits easy swiveling of load.

—hook never opens except under excessive overloads of 4 to 5 times rated capacity, and then it opens slowly without fracture.

CHAIN HOISTS—TROLLEYS—TRAVELING CRANES—JIB CRANES—LOW HEAD ROOM TROLLEY HOISTS—TWIN HOOK HOISTS—HAND WINCHES, Etc.

You can secure WRIGHT Equipment from your Jobber

WRITE FOR NEW CATALOG

**WRIGHT MANUFACTURING COMPANY**
**BRIDGEPORT, CONNECTICUT.**

ACCO
An Associate Company of American Chain Company Inc.
In business for Your Safety

# SERVING WEST TEXAS

## 2300 MILES OF POWER LINES
## 112 POINTS OF DISTRIBUTION
## 70,000 HORSE POWER

FROM 3 major generating stations and 22 auxiliary plants the West Texas Utilities Company drives 70,000 horse power of electricity over 2300 miles of power lines to serve 45 counties in West Texas thru 112 points of distribution.

Crews of expert linemen stationed at strategic points constantly patrol and inspect the "high lines" of this company which carry this vital power "fluid" so that oil operators who depend upon electricity for their power may enjoy perpetual and dependable service.

In all kinds of weather—regardless of the condition of oil field roads—operators whose "power" comes by "wire" are ready to go or to stop at a moment's notice—with minimum fire hazard—with power costs which are steadily growing cheaper—and NEVER higher.

Far-seeing executives are selecting pipe line routes that follow closely the power lines—even when it is necessary to lay extra miles of pipe to do so—

BECAUSE electric power pumping stations
—are easier to keep clean.
—can be shut down without waste or started again at a moment's notice.
—can be made automatic without any attendant in charge.
—will deliver oil at the refineries at lower cost per barrel.

*Let our engineers submit estimates of the operating cost for your next pumping station and show you how easily it may be "electrically equipped."*

WEST TEXAS UTILITIES COMPANY
*In the Land of Opportunity*
GENERAL OFFICES · ABILENE, TEXAS

# YOU CAN'T SUGAR-COAT LOST PROFITS

PROTECT YOUR PIPE LINE INVESTMENT *AT THE TIME YOU ORDER YOUR PIPE.* YOU CAN DO IT NOW BY SPECIFYING THE HILL, HUBBELL & COMPANY PROCESS OF MACHINE COATING AND WRAPPING NOW AVAILABLE FOR THE PRODUCTION OF SIX LEADING PIPE MILLS. WRITE FOR FULL INFORMATION.

**FOR** many years the insatiable call for oil — and more oil — kept operators on the jump, day and night, to supply the demand. Line pipe was dumped into the ground unprotected. Any measures were justified that would speed up laying the lines and pipe the liquid gold to the sales terminals and cash in. But no more. Competition, as well as good business practice, demands protection of the pipe lines themselves in order to protect the investors. Profits decimated by huge costs of digging up, reconditioning and relaying pipe lines, are gone forever and no amount of sugar will sweeten disappointed stockholders.

For twenty-three years this organization has been developing a group of protective coatings that would meet the rigid requirements of owners and operators of pipe lines. Biturine Coatings have established a dead-line for corrosion and its destructive allies. Pipe coated with Biturine is proof against corrosion, acids, alkalis. Biturine protected pipe is being laid in ever-increasing mileage every year and is enthusiastically endorsed by operators and their engineering experts. Biturine has met the stiffest tests in competition and proved its superiority beyond question. Thousands and thousands of miles of Biturine Coated pipes are giving their owners worry-proof service and turning reconditioning "write-offs" into dividends.

***Records of Biturine Coated lines will be furnished to those interested. Write to any of the offices listed opposite.***

**BITURINE COATINGS**

Biturine Enamel
*Biturine Enamel Primer
Biturine Coupling Solution
Biturine Solution No. 5
Biturine 70-30

*Biturine Enamel Primer can be obtained with Inhiburine

**INHIBURINE**

This new inhibitor with extraordinary anti-corrosive powers is now being incorporated into Biturine Primer whenever specified. Being solvent in bitumens it becomes an integral part of the priming and functions as a second line of defense against corrosion should the Biturine Coating be penetrated.

**GENERAL PAINT CORPORATION**

HILL, HUBBELL & COMPANY DIVISION

PAINTS — VARNISHES — LACQUERS

*Specialists in the science of protective coatings for industry*

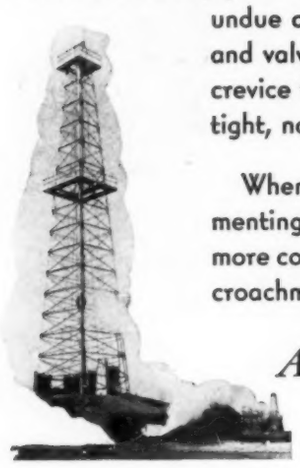
Chicago New York Tulsa Houston Dallas San Francisco
Oakland Los Angeles Portland Seattle Spokane

*Export Offices:* 11 Broadway, New York, N. Y., U. S. A.
160 Fremont Street, San Francisco, Calif., U. S. A.

# UNDERGROUND PERFORMANCE

## . . . that's what counts in OIL WELL CEMENTING

Oilmax Cement is specially processed to meet the difficult conditions encountered UNDERGROUND. It is made exclusively for oil well cementing . . . made to be used neat without admixtures or accelerators. Oilmax will set up successfully in oily and salt water . . . in water containing such chemicals as sodium chloride, magnesium chloride or calcium sulphate. Even under these conditions it gets as hard in 24 hours as ordinary cement in 10 days. Oilmax Cement is easily placed . . . its high plasticity eliminates undue abrasion in pump cylinders, pistons and valves and enables it to slip into every crevice without bridging, to form a watertight, non-shrinking concrete.



When you want to be sure of your cementing job use Oilmax. It will give you a more complete protection against water encroachments, blowouts and casing collapse.

*Available Thru Dealers!*

Produced ONLY by

ASH GROVE LIME & PORTLAND CEMENT CO.

Founded in 1882

KANSAS CITY, MO. OMAHA, NEBR.

District Sales Office: Oklahoma City, Okla. Phone 2-0642

## After Another Cement Had Failed!

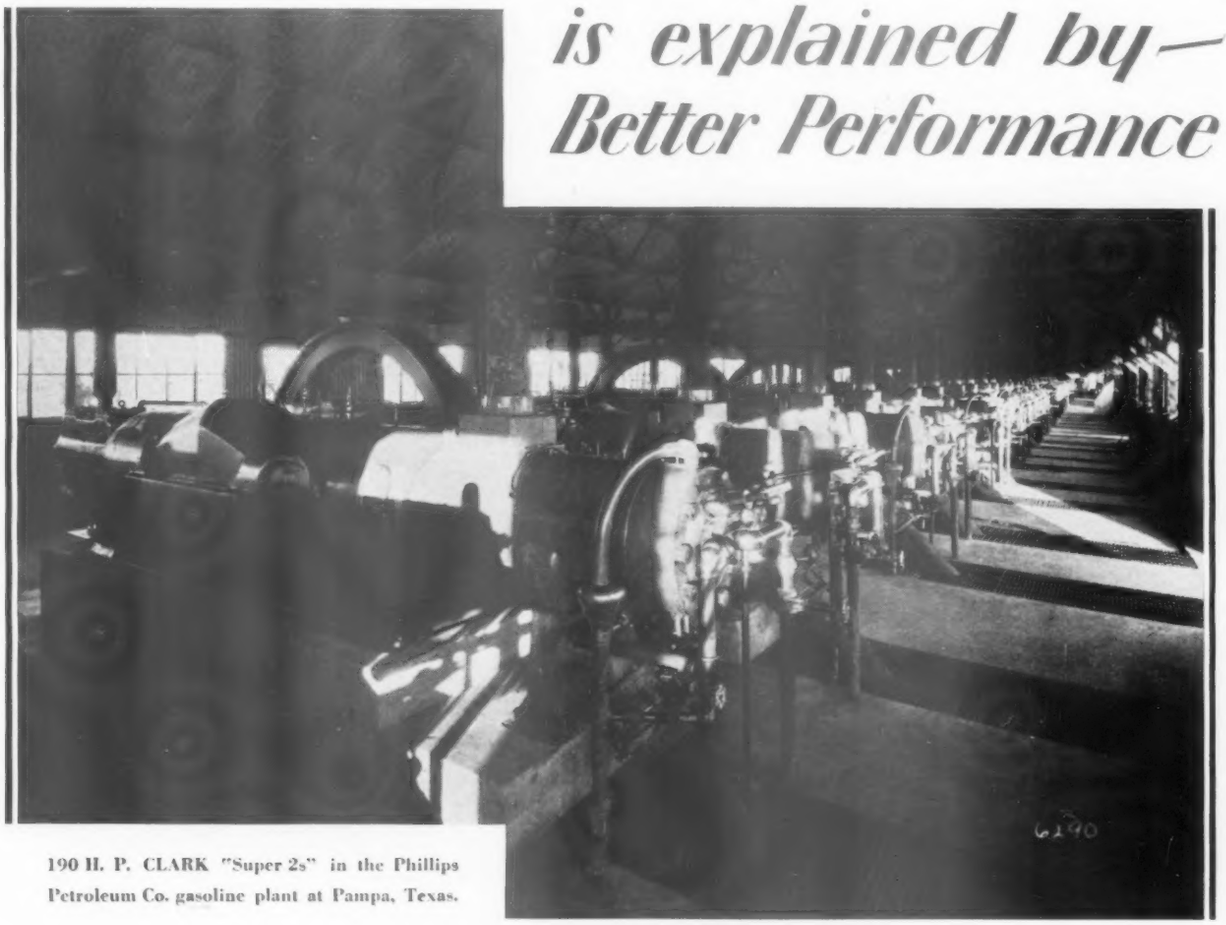
Oilmax Cement came to the rescue in cementing Shawver No. 1 well in the Golden Triangle Sector of the Valley Center Pool, AFTER ANOTHER CEMENT HAD APPARENTLY FAILED. Within 40 hours the Oilmax Cement was hard enough to allow drillers to resume operations. You can depend on the UNDERGROUND performance of Oilmax Cement.

**OILMAX CEMENT**

SPECIALLY PROCESSED FOR OIL WELL CEMENTING

# Super 2 popularity

## *is explained by— Better Performance*



190 H. P. CLARK "Super 2s" in the Phillips Petroleum Co. gasoline plant at Pampa, Texas.

**CLARK "SUPER 2s"** —with the patented and exclusive CLARK Fuel Injector — are 2-cycle machines developed to the highest standards of performance ever attained by engines for oil field service. They give well nigh perfect running-time records. They operate on one-third less fuel than ordinary 2-cycle engines.

Thorough investigation of CLARK Super 2 performance will reveal to you the reason for the great and growing popularity of these machines.

Compressors and Gas Engines

**CLARK BROS. COMPANY**

OLEAN, NEW YORK

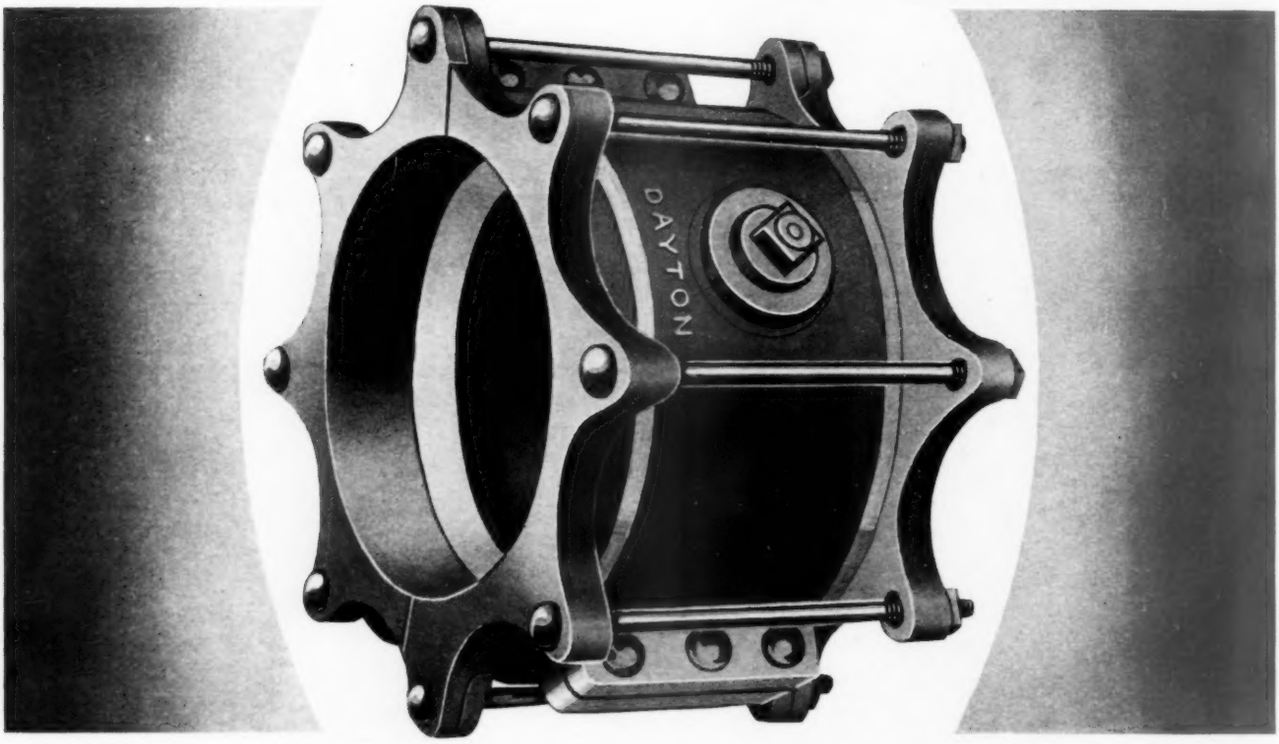
Export Office: 150 Broadway, New York City

Warehouses: Tulsa, Oklahoma; McCamey and Sweetwater, Texas; Artesia, New Mexico

California: Smith, Booth, Usher Company, 228 S. Central Ave., Los Angeles

Mid-Continent Sales Offices: Tulsa and Fort Worth

**CLARK**



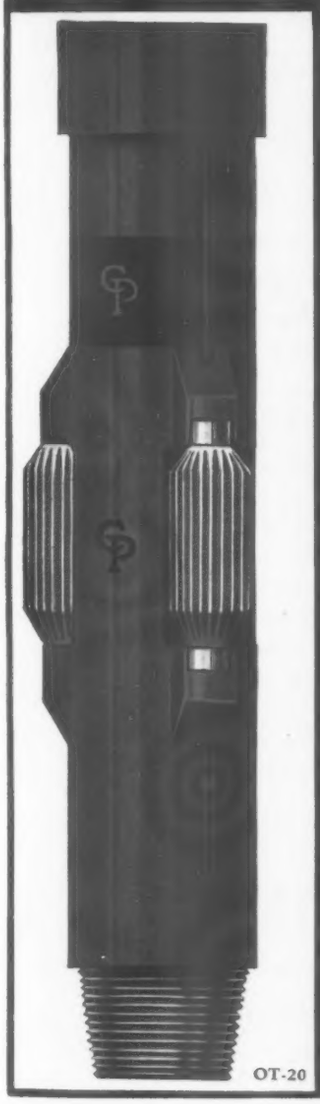

# Dayton
## No. 8½
# SPLIT SLEEVE

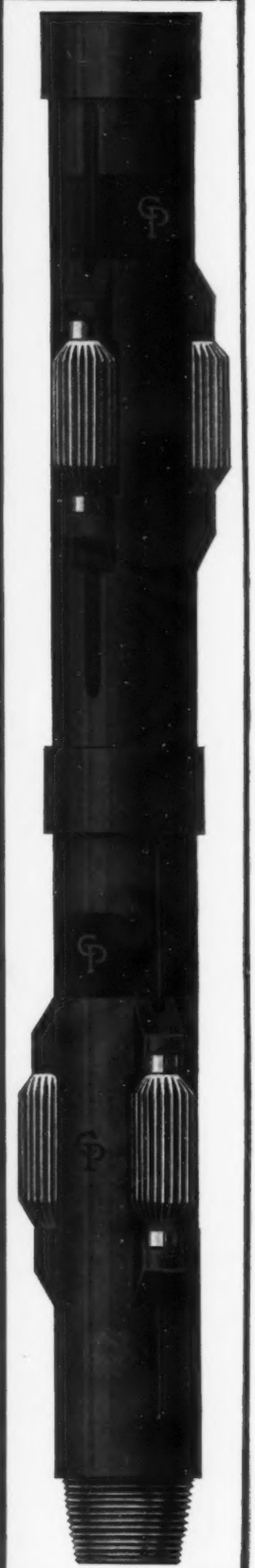
***For use over any Type Welded Joint***

**THE NATIONAL SUPPLY COMPANIES**

# NEW CP SPECIAL REAMERS

over 34% clearance




Ample shoulder for elevator and overshot.

Uses highly efficient patented CP Reamer Cutters which are easily and quickly replaceable without removing reamer from drill pipe.

One-piece bodies of solid manganese steel, assuring STRENGTH, RIGIDITY and DURABILITY.

All wearing parts removable.

Send for complete catalog No. 930 illustrating and describing CP Tucone Rock Bits and Special Reamers.

## CHICAGO PNEUMATIC TOOL COMPANY

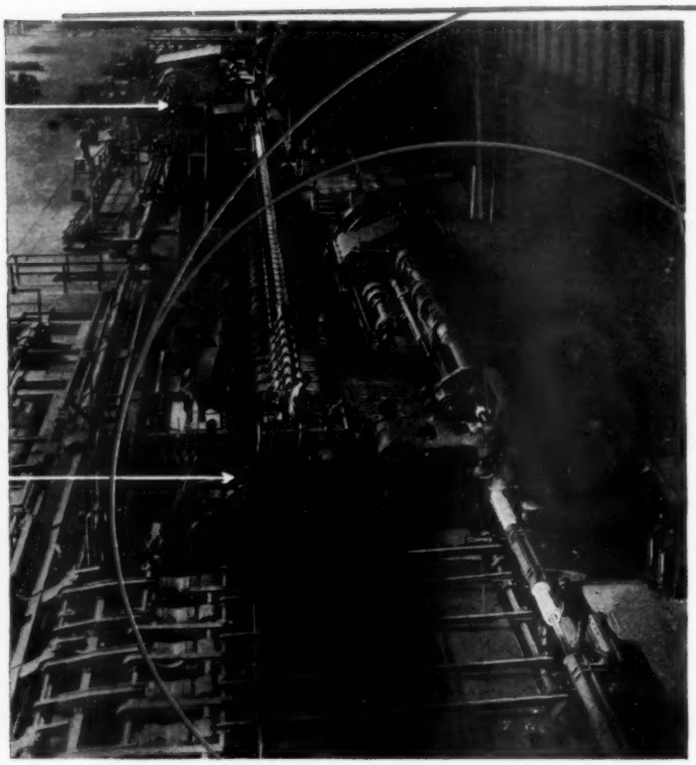
OIL TOOL DIVISION OFFICES

6 East 44th St., NEW YORK

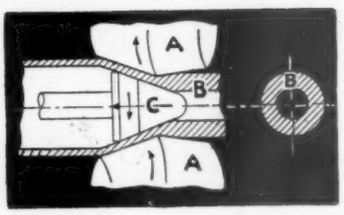
655 Santa Fe Ave. LOS ANGELES

1 West 16th St. OKLAHOMA CITY

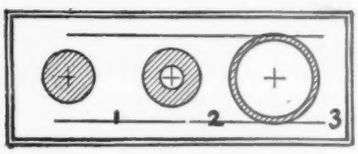
# An Extra Step




Pictured are first and second piercers of the No. 2 J&L Seamless Mill at Aliquippa, Pa. All the heavy machinery circled in red is necessary to the second piercing.




Sketch showing, in cut-a-way form, the action of the second piercer in J & L Seamless Pipe manufacture. The rolls, "A" carry the tube, "B" over the second piercing, or expanding point, "C."




Development of cross-section in seamless tube manufacture: 1. Before piercing; 2. After first piercing; 3. After second piercing.

# to Protect the Steel in J & L Seamless

IN producing all but the smallest sizes of seamless, J & L employs mill machinery that first pierces a small hole the length of the solid hot steel bar and then, in a second, or *extra operation,* enlarges this hole. By converting the solid bar into a tube by easy stages, J & L actually protects the steel against internal strains that, if permitted, would be detrimental to the finished seamless pipe. By this most advanced method of seamless manufacture, J & L also obtains, in the very first process, a tube of relatively uniform wall thickness.

## JONES & LAUGHLIN STEEL CORPORATION

**AMERICAN IRON AND STEEL WORKS**

J&L STEEL

**Manufacturers of Seamless and Welded Casing, Tubing, Drill Pipe and Line Pipe, and Welded Steam, Gas and Water Pipe in both Black and Galvanized.**

**Also makers of Bars, Shapes and Plates, Reinforcing Bars, Cold Finished Steel, Junior Beams, Steel Piling, Fabricated Structural Work, Steel Barges, Wire Products and Tin Mill Products.**

**JONES & LAUGHLIN BUILDING, PITTSBURGH, PENNSYLVANIA**

# *The* LARKIN *Improved* SAND PUMP

## —and the BIT BOTTOM that chisels its way in

The "Bit" Bottom is used for drilling and breaking the sand loose. Its chisel shaped design is unique, prevents sticking, and allows successful operation in tightly packed sands.

**For that tough job where the cavings have packed hard—there is the Larkin Bit Bottom. As its name implies, it is used for drilling and breaking the sand loose. It will break up the hard formations so efficiently, and pass the material through to the pump so quickly, that the pump may be operated at full capacity without being delayed to any extent—even by the worst conditions encountered. To be prepared for any job, no matter how difficult, get the Larkin and have it equipped with both the Regular Bottom and Bit Bottom to give better than ordinary cleaning-out service.**

**This Leader of all Sand Pumps will clean out your wells quickly, thoroughly; it will last through years of hard service. It is the most efficient sand pump on the market.**

***Sold by leading Supply Stores. Send for Circular and Price List.***

*Made only by*

## LARKIN & COMPANY

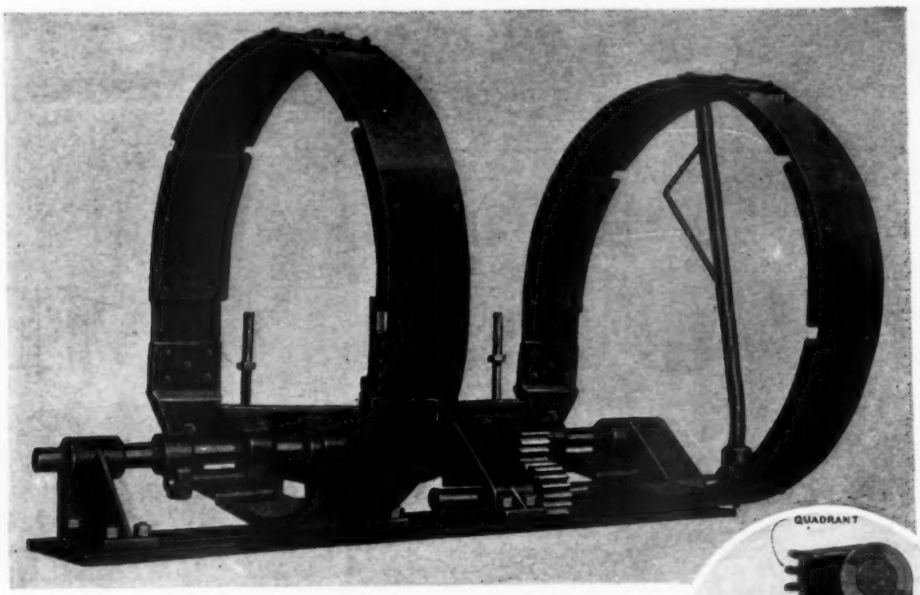
**at BUTLER, Pa.**

**Makers of the LARKIN Line of Supplies**

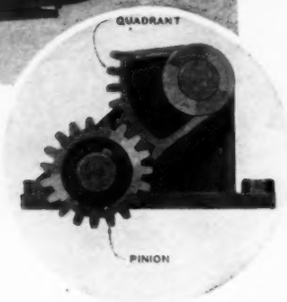
*for* REGULAR Jobs

***Regular Bottom***

In the Larkin Regular Bottom, the legs are short, allowing the pump to rest as near the bottom of the hole as possible and still obtain the necessary suction to remove the greatest amount of sand and sediment quickly.



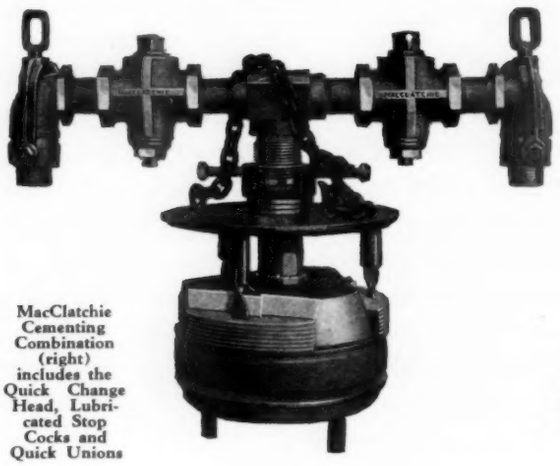
Rear view of MacClatchie Geared Brake for Draw-works, showing the equalizer in the background. The gears are shown at the right.



(Right) Cut-away view of MacClatchie Rotary Under-reamer

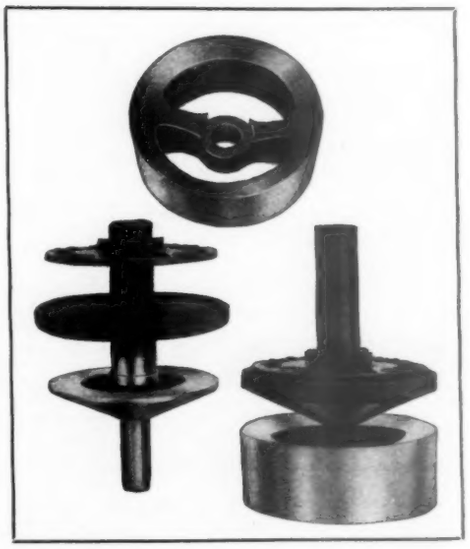
# This page merits 15 minutes of any oil man's day . . . .

Careful consideration of a picture should tell you, as an experienced oil man, a good deal about the fundamental principles involved in an oilfield specialty. The illustrations on this page...each one of which plainly shows the simple principle on which the design is based...are enough, we believe, to indicate the practicality and efficiency of MacClatchie specialties. Clip the coupon for further information.



MacClatchie Cementing Combination (right) includes the Quick Change Head, Lubricated Stop Cocks and Quick Unions

There are more MacClatchie Mud Pump Valves sold than any other make. Quality is responsible! (Below.)



OW-3-30

**MacClatchie Manufacturing Co.,**
**Compton, Calif.**

Gentlemen:

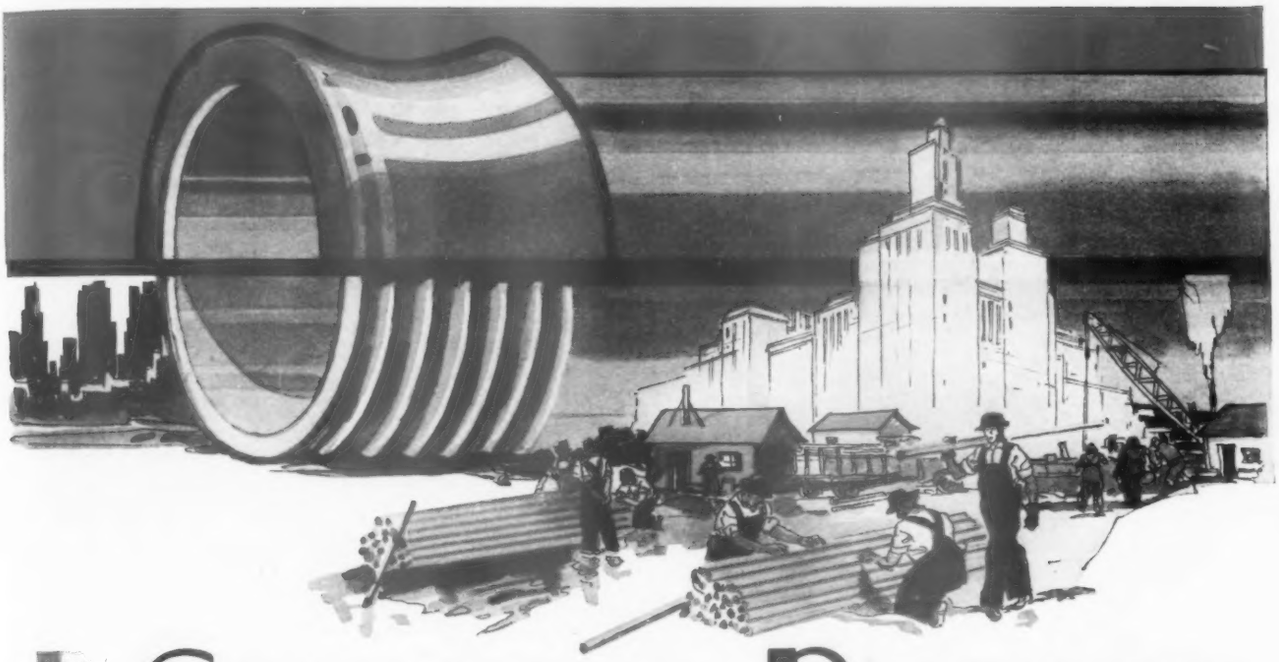
*Please send me information on the items checked below:*

Automatic Safety Catheads — Geared Brakes — Rotary Under-reamers
Mud Pump Valves — Quick Unions — Stop Cocks — Quick Change Heads
Flow Nipples — Valve Seat and Pump Liner Pullers — Pump Pistons
MacClatchie "Panther" Aircraft Engines

☐ Send me a general catalog.

Name ..... Position .....

Company ..... Address .....



# It STANDS to REASON

Making pipe to the strictest standards of workmanship is ONLY ONE HALF OF THE JOB of rendering satisfactory service to the pipe user.

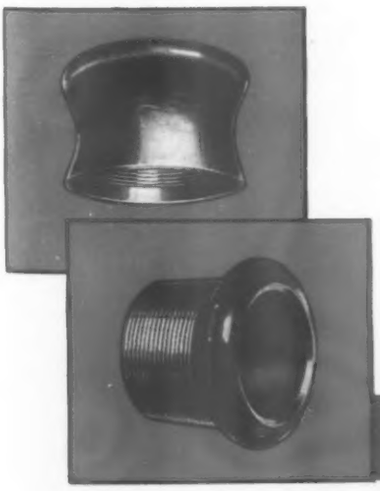
THE BIG THING, equally important, is to ship it to destination without damage to the threaded pipe ends and couplings.

With the advent of the patented COLONA PIPE THREAD PROTECTORS, leading pipe manufacturers are today able to ship their pipe to all parts of the world with the absolute certainty that every length will arrive in the same perfect condition as when it left the mill.

Remember that Colona Thread Protectors SAFEGUARD BOTH THE THREADED PIPE ENDS AND THE COUPLINGS AS WELL. Moreover the ends of the pipe are amply protected against mushrooming by the exclusive lip design of Colona Protectors.

ASSURE YOURSELF of the protective features of Colona by specifying Colona Protected Pipe in your order requisitions.

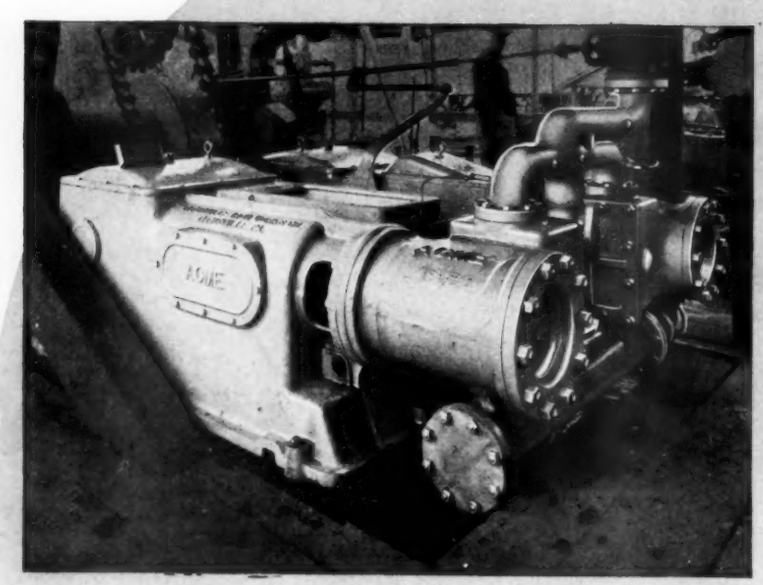
**PITTSBURGH SCREW & BOLT CORP.**
**COLONA DIVISION** **PITTSBURGH, PA.**



# ¢OLONA

## PIPE THREAD PROTECTORS

# "5 DAYS .. a 1700 ft. hole and everything going fine"



TITUSVILLE OIL COUNTRY MACHINERY BUILT WITH RESERVE RUGGEDNESS

THAT'S a typical report where the ACME Roller Bearing Twin Cylinder Steam Engine carries the drilling load. And that's natural enough since the ACME Steam Engine is built specifically for use in the oil fields.

Oil men everywhere have found the ACME Steam Engine a thoroughly dependable power unit that could "stand the gaff" and give the kind of 24-hour service they demand.

That, of course, is the kind of equipment you want and if you'll just say the word we'll see that you get all the details.

TITUSVILLE
*Oil Field Equipment*

Twin Cylinder Steam Engines
Single Cylinder Steam Engines
TICO 2-cycle Gas Engines
TICO 4-cycle Gas Engines
Rotary Drilling Equipment
Band Wheels—Geared Powers
A. S. M. E. Code Portable Boilers (Locomotive — Return Tubular)
Air Compressors — Acid Blowers
Heating and Power Boilers
Tanks and Steel Plate Work
Flapper Valve Pumps
Rotary Slush Pumps
Pressure and Vacuum Valves

THE TITUSVILLE IRON WORKS COMPANY
*Division of Struthers Wells-Titusville Corporation*
TITUSVILLE, PA.

*Mid-Continent Office*
503 Exchange National Bank Building
Tulsa, Okla.

*For California*
California Machinery & Supply Co.
2449 Hunter St., Los Angeles, Calif.

*For Kansas, Oklahoma and Northwestern Texas*
International Supply Company,
Tulsa, Okla.

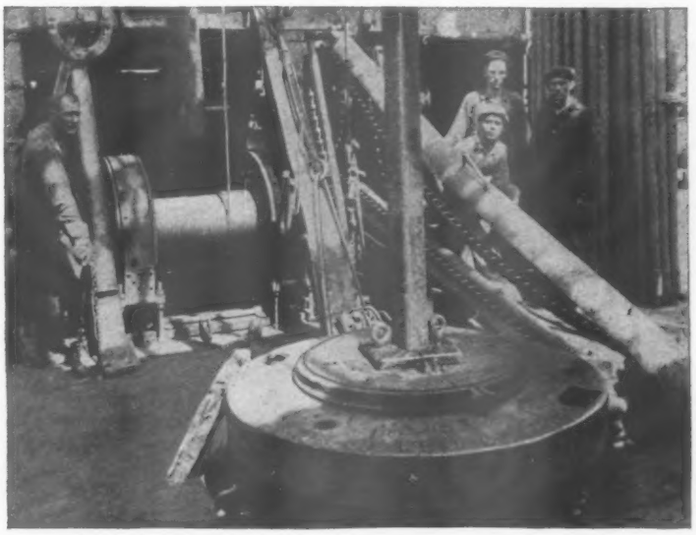
*For Texas, Louisiana, Arkansas and New Mexico*
Mid-Continent Supply Company,
Fort Worth, Texas

*For Export:* American Steel Export Company, Inc., 535 Fifth Ave., New York, N. Y.

TITUSVILLE
OIL FIELD EQUIPMENT
GAS ENGINES—PUMPS—BOILERS—DRILLING RIGS—STEAM ENGINES

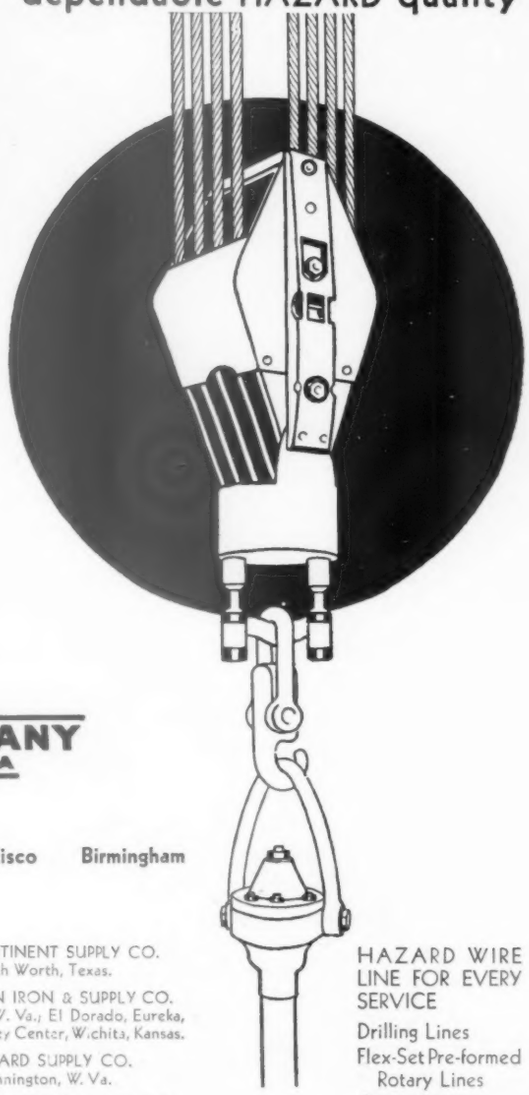
TIW-40

# HAZARD



## FLEX-SET ROTARY LINES

**Pre-formed Wire Line of dependable HAZARD quality**



PRE-FORMED rotary drilling lines—built by Hazard—with extra strength and flexibility to withstand constant bends without injury, are cutting rope costs on many rotary operations.

Let us send you complete information on the advantages of "Flex-Set", and other Hazard Wire lines for oil country usage.

Complete stocks carried at branches and distributors listed.

**HAZARD WIRE ROPE COMPANY**
WILKES-BARRE PENNSYLVANIA

**1625 South Troost Avenue, Tulsa, Okla.**

**New York Pittsburgh Chicago Denver Los Angeles San Francisco Birmingham**

**DISTRIBUTORS**

BOVAIRD SUPPLY CO.
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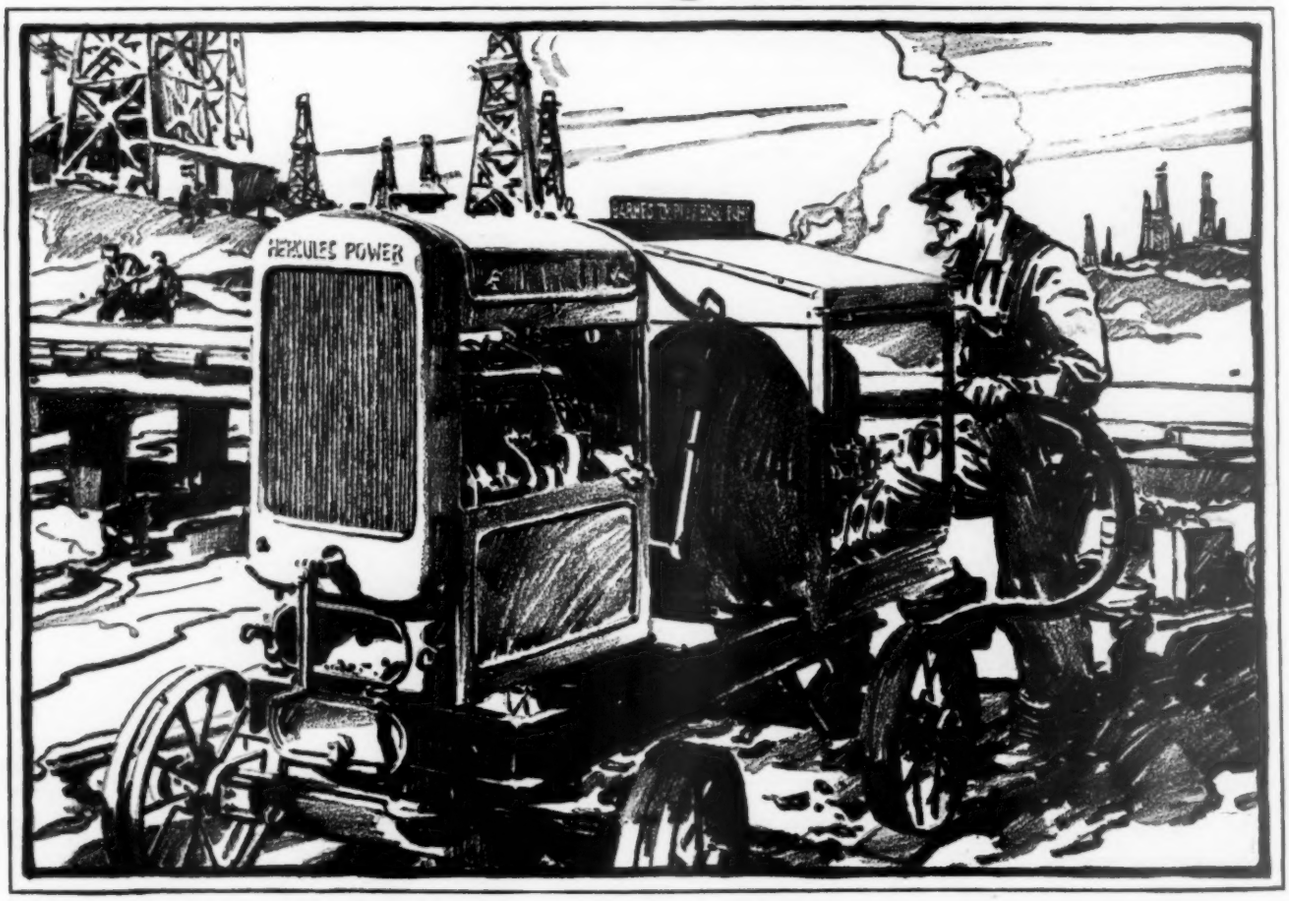
UNITED OIL WELL & SUPPLY CO.
Los Angeles, Cal.

HAZARD WIRE LINE FOR EVERY SERVICE

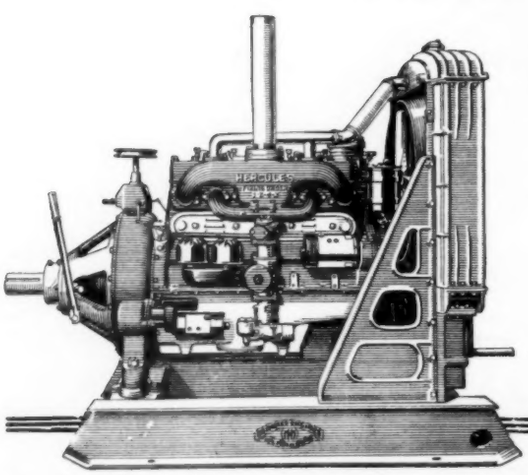
Drilling Lines
Flex-Set Pre-formed Rotary Lines
Casing Lines
Sucker Rod Lines
Sand and Mandrel Lines
Wire Strand

# Power for Cross-Country Pumping —with Hercules Engines on the Job




Driving a Barnes Triplex Road Pump steadily, day after day, a Hercules Power Unit insures an unfailing high-pressure flow of water to distant rotary drills on the leases of T. B. Slick, Incorporated, in the Seminole, Oklahoma, oil fields.

In the oil fields—where steady operation is essential—Hercules Engines are particularly noted for their outstanding reliability. Powerful—simple in design and rugged in construction—they are built throughout to withstand the strain of grueling 24-hour-a-day service with a minimum of attention and expense.



HERCULES MOTORS CORPORATION
Canton, Ohio, U. S. A.
WEST COAST BRANCH: LOS ANGELES, CAL.
MID-CONTINENT BRANCH: TULSA, OKLA.

Hercules Power Units and parts are also carried by the Norvell-Wilder Supply Company of Houston, Texas; Beaumont, Texas; Fort Worth, Texas; and Shreveport, Louisiana.

# HERCULES ENGINES

# PIPE LAYER'S HEAVEN

(In the language of the pipe liner, any country that is especially easy to go through with a pipe line is known as "pipe layer's heaven.")

An old timer told us that with SMITHWelded Line Pipe and SMITHWeld Bell and Spigot and Expansion Bending Joints, all kinds of country become "PIPE LAYER'S HEAVEN."

A. O. SMITH CORPORATION, *General Offices:* Milwaukee, Wisconsin
OIL AND GAS FIELD PRODUCTS DIVISION
*District Offices:* New York · Tulsa · Los Angeles · Houston

**SMITH*WELDED***
**GAS LINE PIPE**

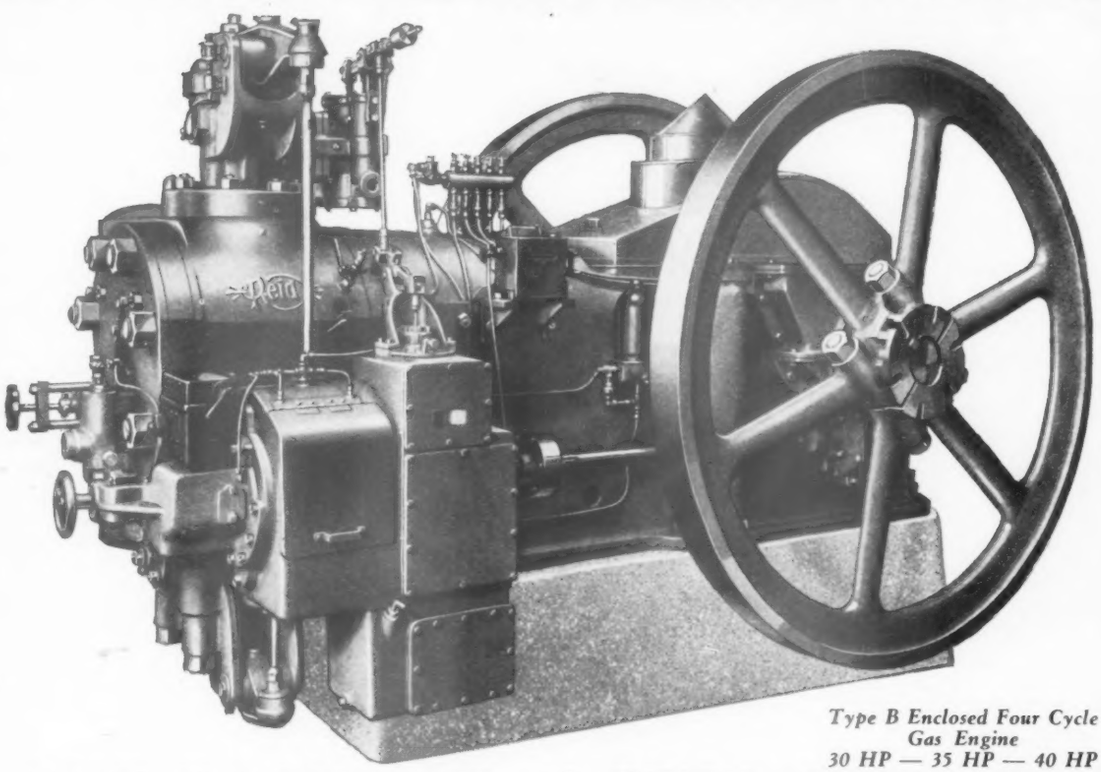
# A PRODUCT OF BROAD VISION

**Back in February of 1910 when the Exchange National Bank opened for business in an humble location, none had the daring imagination to foresee . . . at the end of twenty years of progress . . . an Exchange National Bank of international influence. The Exchange National saw an opportunity to render outstanding service to an industry at a time when both bank and industry were juveniles. Courageous aggression made a giant of oil; and because those who shaped its policies were inspired by faith, broad vision and a thorough understanding of the industry, the Exchange National itself became an institutional giant . . . The Oil Bank of America.**

EXCHANGE BANKS OF TULSA

*Exchange National Bank* · *Exchange Trust Company* · *Exchange National Company*

**Combined Capital, Surplus and Undivided Profits Exceed $10,000,000**
**Resources Exceed $100,000,000**



*Type B Enclosed Four Cycle Gas Engine*
*30 HP — 35 HP — 40 HP*

# THE ECONOMY of REID QUALITY

**Economy in a gas engine is not established by low initial cost. It is the faithful year-in, year-out performance under all conditions—the built-in quality—that determines true economy.**

**The Reid Four Cycle Gas Engine, with the stamina to withstand long periods of continuous operation without servicing or adjustment, has earned a reputation for truly faithful performance under all conditions. It has abundant power over a wide speed range, is practically noiseless in operation, and handles its load with smoothness and stability.**

**Machined main bearing housings that can be fitted with either Timken Roller Bearings or replaceable shells, Timken layshaft bearings, and a positive lubricating system incorporating an oil Purolator, are other quality features that make this Reid engine a really economical prime mover.**

## JOSEPH REID GAS ENGINE COMPANY, OIL CITY, PENNSYLVANIA, U. S. A.

BRANCHES—Marietta, Newark, and Logan, Ohio; Charleston, W. Va.; S. R. Shoup, 724 Board of Trade Building, Los Angeles, California.

EXPORT SALES REPRESENTATIVE—Oil Field Equipment Co., Inc., 30 Church Street, New York City.

DISTRIBUTORS—Frick-Reid Supply Corp., Pittsburgh, Pa., and Tulsa, Oklahoma, Distributors for Bradford and Pittsburgh, Pa., Muskegon and Mt. Pleasant, Mich., Kentucky, Oklahoma, Kansas, Texas, Arkansas, Louisiana, and Wyoming; R. B. Moore, Bolivar, N. Y.; distributed in California by The Republic Supply Co. of California, Los Angeles, Calif.

# Fill your tank at the black & white pump

# —Which thousands more can do with your assistance

THE wide-spread distribution of Cities Service Company securities has developed an insistent demand for opportunity to purchase regularly Cities Service pertroleum products.

Numerous cities outside the network of company-owned service facilities offer a ready-made market to dealers in Cities Service products.

"ONCE — ALWAYS"

Cities Service gasolene, oils and greases are consistently good. Every step in their manufacture is under Cities Service control.

And 67 years of experience have shown Cities Service experts how to make oils and gasolene that really are superior—products that actually give better service and performance—products that make constant users.

ACTUAL SERVICE TESTS

Before it is offered on the market, each Cities Service oil product is put to the most conclusive test—actual service in the Cities Service fleet of over 4000 motor vehicles. Its quality is definitely established.

*Main Office:*
BARTLESVILLE, OKLA.
*Refinery Sales Office:*
TULSA, OKLAHOMA

# The Empire Companies

*Subsidiaries of Cities Service Co.*

CITIES SERVICE OILS
ONCE - ALWAYS

# 7818 FEET

The Kingwood Oil Company recently finished drilling a 7818 foot well in Irion County, Texas.

With a Young BIG BOY Drilling Engine.

One company has purchased a total of 28 Young Engines. There's a reason.

Economy of operation, dependability and long life are but a few of the many reasons for Young Engine preference.

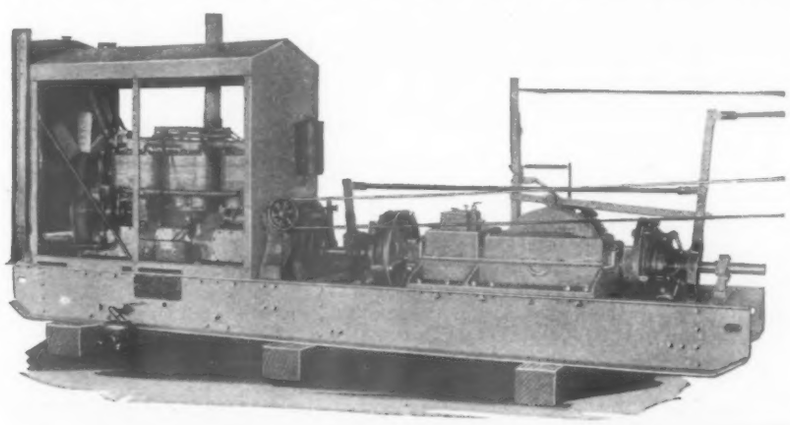
Send the coupon for latest bulletin on Young's IMPROVED BIG BOY.

YOUNG ENGINES

CANTON, OHIO

Rig of the Kingwood Oil Co., at their Sugg No. 1, C.S.E., Quarter Section 19, Irion County, Texas. This well was recently finished at 7818 feet. The drilling engine is a Young BIG BOY, Model 130-R.

**For Deep Drilling — Young's IMPROVED BIG BOY**



THE YOUNG ENGINE CORP., W-314
Canton, Ohio.

Send us, without obligation, latest bulletin on Young's IMPROVED BIG BOY.

Name .....

THE MODERN TREND IN THE PETROLEUM INDUSTRY IS TO PURCHASED ELECTRIC POWER

for

Oil Well Pumping . .

Pipe Line Pumping . .

Oil Refining . . . . .

It Will Pay You to Investigate

TEXAS POWER & LIGHT COMPANY

*General Offices:* Interurban Building . . . Dallas

*Providing for the Texas of Today---Planning for the Texas of Tomorrow*

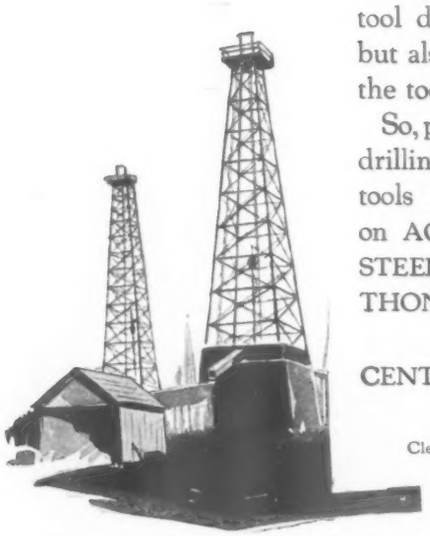
# Only Tools of AGATHON STEEL Have AGATHON Endurance

OPERATORS who carefully check tool service and tool costs recognize that efficient, low cost service depends not alone on tool design, or workmanship—but also on the steel from which the tool is made.

So, prominent manufacturers of drilling tools and fishing tools have standardized on AGATHON ALLOY STEELS—because AGATHON endurance can be secured from no other steel.

AGATHON ALLOY STEELS are the product of the world's largest and most highly specialized producer of alloy steels for oil field usage.

The AGATHON ALLOY Handbook contains complete data, as well as helpful suggestions relative to the proper selection of steels for all requirements. Send for a copy.



CENTRAL ALLOY STEEL CORPORATION, MASSILLON, OHIO

*World's Largest and Most Highly Specialized Alloy Steel Producers*

*Makers of Toncan Copper Mo-lyb-den-um Iron*

Cleveland Detroit Chicago New York St. Louis
Syracuse Philadelphia Los Angeles Seattle
Cincinnati San Francisco

Export Office: New York Central Building, New York, N. Y.

**AGATHON ALLOY STEELS**

# "For every joint on every line"

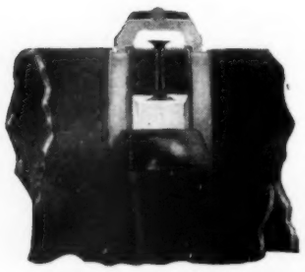
**For low installation costs—and leak-proof pipe lines—Victaulic Couplings have earned specification by leading oil and gas companies—also for mine, water and sewer service.**

• • •

**Mail the Coupon for Victaulic Bulletin**

For all sizes of steel, wrought iron, cast iron and spiral weld pipe—any pressure. Mail the coupon for detailed information.

VICTAULIC COMPANY OF AMERICA
26 Broadway New York



*"For every joint on every line"*

FLEXIBLE LEAK-PROOF

VICTAULIC

REG. U. S. PAT. OFF.

PIPE COUPLINGS

VICTAULIC DISTRIBUTORS

*Mid-Continent and Rocky Mountains*
HANLON-WATERS, INC.
Tulsa, Oklahoma

*Pacific Coast*
DUCOMMUN CORPORATION
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San Francisco, California

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PITTSBURGH SUPPLY COMPANY
Pittsburgh, Pennsylvania

*Illinois, Indiana*
BELL and GOSSETT
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CASE HARDENING SERVICE CO.
Cleveland, Ohio

*Minnesota, Wisconsin, Iowa*
F. S. VAN BERGEN
Minneapolis, Minnesota

*Canada*
D. B. McWILLIAMS
Toronto, Canada

*West Virginia and Kentucky*
THE McJUNKIN SUPPLY CO.
Charleston, West Virginia

**FOR OIL, GAS, WATER, SEWAGE, COMPRESSED AIR, ETC.**

For uses, installations, specifications and prices, fill in and mail this coupon.

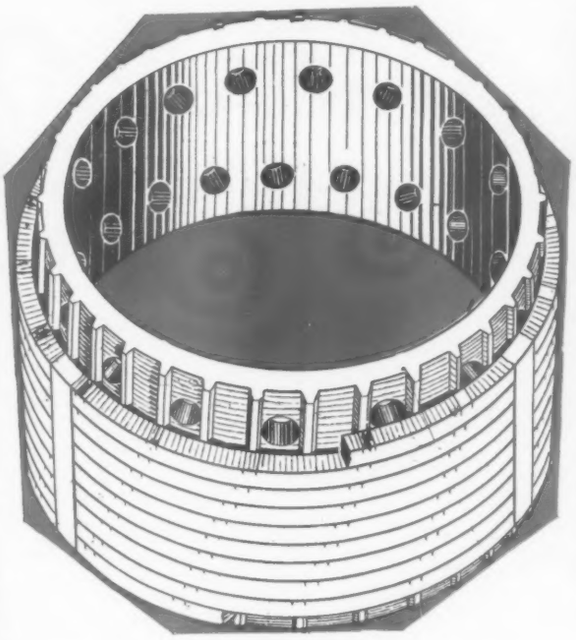
VICTAULIC COMPANY OF AMERICA
26 Broadway New York

*Please send me Victaulic Bulletin No. 8*

Name.....

Address.....

# THE SCREEN IS AT THE *Money Point*



**OIL MEN!** You should give the utmost attention to the screen you buy. Remember that the screen is at the point of contact between the oil sand which has potential value and oil which has real value. The screen is at the **MONEY POINT.**

STANCLIFF—THE STRONGEST WIRE-WRAPPED SCREEN

Compare with others and see how the *Stancliff excells in strength.*
In order to get receptive capacity some competitors groove the pipe, thus weakening it. The ribs that run up and down the outside of the pipe give additional strength and expansive receptive capacity to the STANCLIFF SCREEN. *This gives the double advantage of more strength and faster screening.*

*GREATEST SCREENING SURFACE OF ALL WIRE-WRAPPED SCREEN*

A brief study of the illustration of the STANCLIFF SCREEN in this ad proves this statement. Note that the entire area of the pipe is screening surface. No other screen has as much room between the wires and the perforations and the ribs keep the wire away from the pipe giving greater receptive capacity. The entire area of the pipe is screening surface.

*Write for Complete Information*

*Reasons Sand Cutting Is Reduced*

The increased screening area and large receptive capacity reduces inlet velocity thereby reducing fluid friction and allowing greater volume of fluid through the screen at a given pressure in the well. This reduced velocity reduces sand cutting and gives longer life to the screen.

*Gauge Does Not Increase With Wear With the Stancliff Screen*

Study the illustration (at the left). Note that the square wires will keep same distance apart when the tops are worn. This is a big advantage over screens where the distance between the wires is greater at the outlet than at the inlet, which condition causes the gauge to increase as the sand wears down the wires. Because the distance between the wires is the same at the top and bottom, the STANCLIFF SCREEN KEEPS ITS GAUGE.

*Does Not Clog Up When Cleaning*

The parallel spacing between the wires facilitates cleaning the strainer. There is no chance to clog up under pump pressure when cleaning as is the case with some other screens not made with square-faced wire.

The STANCLIFF SCREEN is superior from every test. Keep up your oil production. For fast and steady screening use the STANCLIFF SCREEN.

# HOWARD SMITH COMPANY

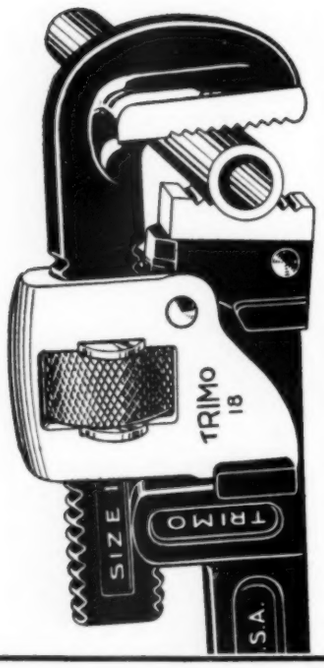
2412 Railroad Avenue at Sawyer Street

Phone P-0131 HOUSTON TEXAS P. O. Box 688

# Strong Arms ~ Strong Wrenches

## the best team for hard work

TRIMO




NO SUPERINTENDENT wants to hire men who aren't strong enough to stick on the job. No workman wants to be put to work with a wrench not strong enough to stick on the job either.

Strong arms and strong wrenches make the best team for work in the oil fields. TRIMO gets the call where a strong pipe wrench is wanted. TRIMO is all steel—the handle drop-forged, not cast—and heat treating adds toughness that stands the strain of brawny arms.

# TRIMO Pipe Wrench

## All Steel for Strength

Made by Trimont Mfg. Co., Inc., Roxbury (Boston), Mass.

# T-I-W DRANO STANDING VALVE

## Over Size --- Long Life

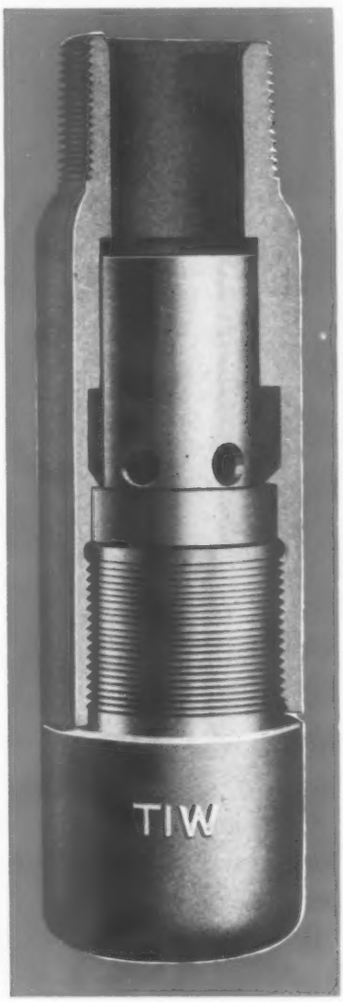
## *Positive Tubing Drain*

**The T. I. W. Drano Standing Valve has greater fluid capacity than any other valve of comparative size, due to the short travel of the sleeve.**

### *Positively Drains the Tubing*

**When a tubing job is necessary, the spear is dropped from the casing head shattering the bottom of the monel iron sleeve, giving a dry tubing job every time.**

**SMOOTH ACTION—NO POUNDING: Cuts down tubing jobs. Eliminates constant pounding that comes from the ball type valve and that is communicated to every rod in the string causing breaks and parts. Non-corrosive and non-magnetic.**




*Patent Pending*
The Drano Standing Valve Assembled

### *Saves Power Money*

**Cost per k.w.h. is governed by the "demand rate" which is established by the "peak" or highest load to which a motor is subjected. Tests have shown that the pulling of a wet string of tubing increases the k.w.h. demand 25% as compared with pulling a dry string of tubing. Because it gives you a dry tubing job, the T.I.W. Drano Standing Valve will cut down your power bills.**

*Greater Fluid Capacity*

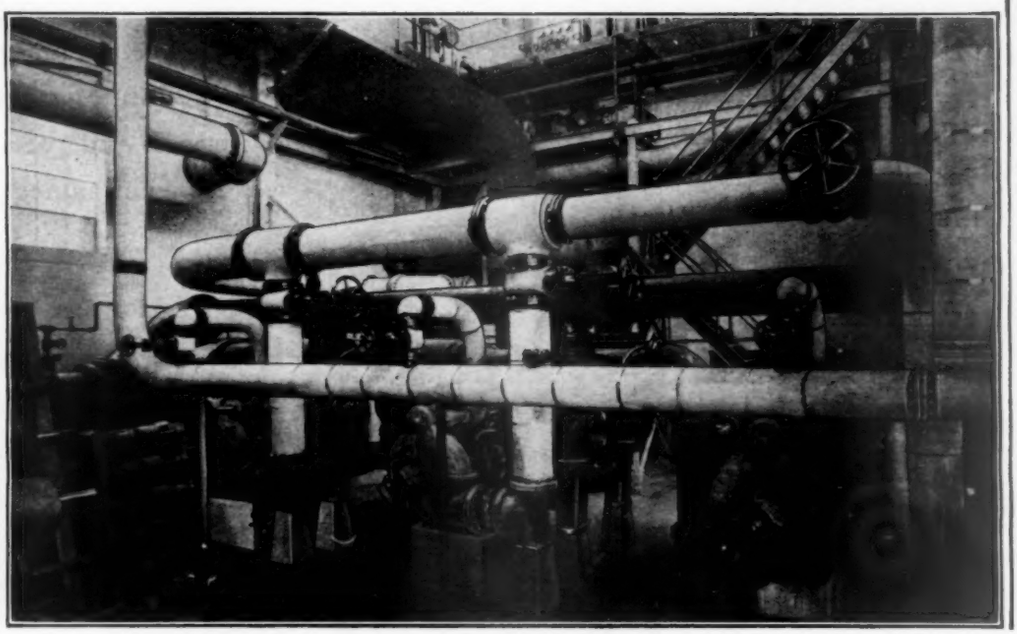
*Positive Tubing Drain*

*Write for Price List and Folder*

# TEXAS IRON WORKS
## SALES CORPORATION

1401-1423 *Maury Street* HOUSTON, TEXAS

# ▲▲▲ if it is ATWOOD PIPING ▲▲▲



YOU can be certain that your piping system is *reliable*, easily *accessible*, that any *possibility of deterioration has been reduced to a minimum*, and that *the most advanced engineering knowledge has been used to insure the highest operating efficiency* for the service intended. In the installation partially illustrated above (one of the largest blast furnace and coke plants in the country) all of these fundamental requirements are incorporated to the greatest degree possible.

Whatever Piping job you may have on hand . . a complete Piping System (designed, manufactured and installed), a Welded Header, a Coil, or only a Pipe Bend . . we shall be pleased to submit an estimate, as well as give you all the help possible.

FOUNDERS SINCE 1825 • VALVES AND PIPING SINCE 1866 • Trade Mark ATWOOD

## PITTSBURGH VALVE, FOUNDRY & CONSTRUCTION CO.
PITTSBURGH ~ PENNA.

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| Chicago, Ill. | 80 East Jackson Blvd. |
| Boston, Mass. | 185 Devonshire Street |
| Cleveland, Ohio | 858 Rockefeller Bldg. |

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|---|---|
| Detroit, Mich. | Garrett Burges, Inc., Woodbrook Bldg. |
| Houston, Texas | Maintenance Eng. Corp., 1400 Conti Street |
| Atlanta, Ga. | Moore-Broach Eng. Co., Forsyth Bldg. |
| Philadelphia, Penna. | R. J. Crozier Co., 10 South 18th Street |
| Los Angeles, Cal. | John G. Bell Co., 712 East Sixth Street |

## VALVES • WELDED PIPING • FITTINGS

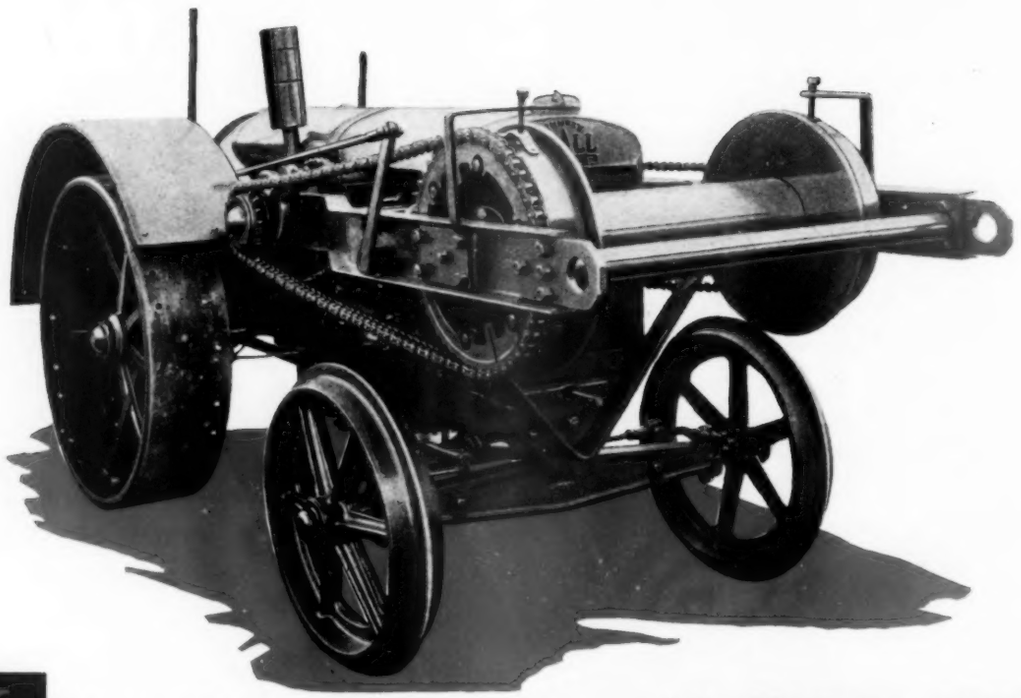
Ductility Increases the Usefulness of Steel Pipe
Republic Steel Pipe adapts itself to installations of a character employing bending, because it is sufficiently ductile without weakening its internal resistant strength.
Where the pipe is to be used for special bending, flanging, swedging, coiling or other severe forming operations, a special pipe for such purposes is determined in Republic Testing Laboratories . . and the unusually high degree of ductility necessary, is assured by definite manufacturing processes controlled from ore to finished pipe. Thus proper ductility or "give in working" combines with "strength" in promoting more satisfactory, more lasting service.
RS
REPUBLIC
IRON & STEEL CO. YOUNGSTOWN O.
STEEL PIPE

# The RUMELY DOALL Will

*Industrial Winch*

TRACTOR

# DO ALL *that they* ALL DO



IT is a notable fact that the Do-All, four-cylinder companion to the big master Rumely Oil-Pull Winch Tractor, although it is a small tractor compared to the OilPull, at that out-pulls and out-maneuvers anything in the competitive field. This only goes to show what a gigantic surplus of power is contained in the master OilPull and what a rugged, compact machine is the DoAll.

It is true, the Rumely DoAll Industrial Winch Tractor, whether on the lease or at the refinery, will do all that they all do and more, too. It will handle any job for which you do not feel the absolute need for the big, heavy-duty Rumely OilPull master tractor. Four speeds forward and two reverse

## *And* MORE, TOO!

give exceptionally high speed of line travel and tremendous lifting power. Ample brakeage is provided for any size job. The DoAll turns in its own length and steers easily with one hand. Few levers, all within easy reach, simplify manipulations. It is speedy and smooth running on the road and at the well. The ideal point of power, speed and compactness is reached in the sensational DoAll.

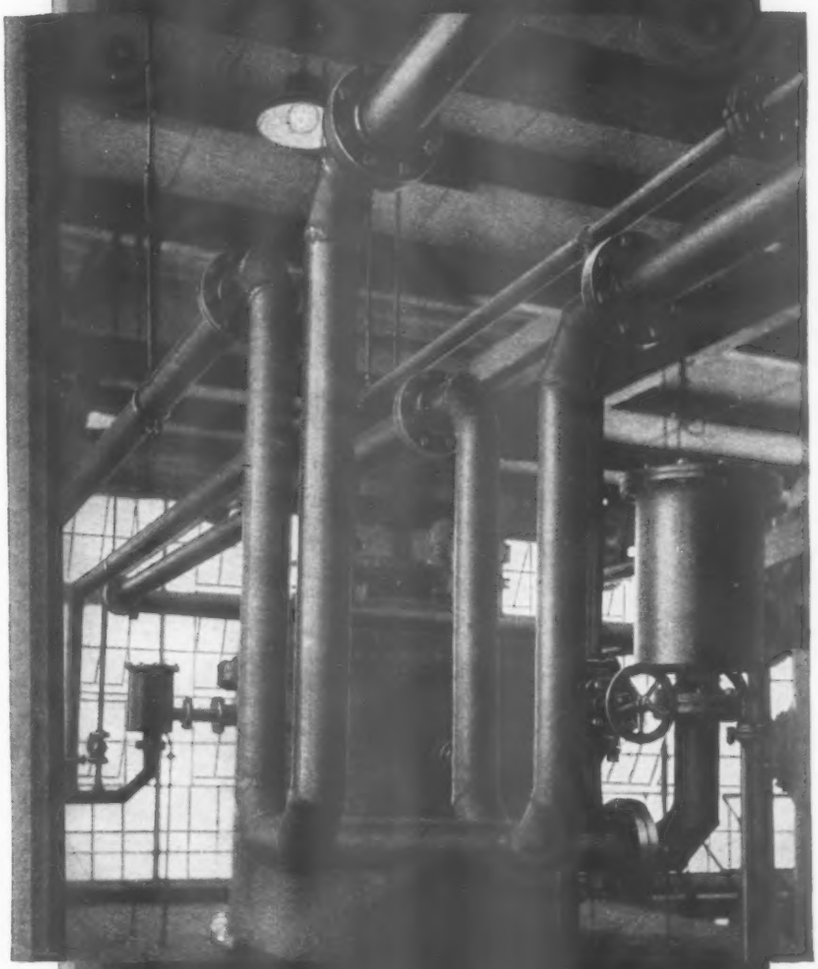
*—Send all inquiries and orders to - - -*

**FRED E. COOPER**

*Special Rumely Representative and Developer of Oil Field Machinery*

18 S. MADISON TULSA, OKLA.

# WELDED Industrial Piping



"Proper methods of inspection and procedure control have been established and are available to all interested; so there is no longer any excuse for poor work. Welded lines are often cheaper in first cost, and are invariably superior in the matter of tightness."

*—From an Editorial in* **POWER**

**As pioneers in procedure control welding, we supply industry with the best of everything for oxwelding and cutting.**

**LINDE OXYGEN**
The Linde Air Products Company

**Oxweld**
**Apparatus and Supplies**
Oxweld Acetylene Company

**Prest-O-Lite**
**Dissolved Acetylene**
The Prest-O-Lite Company, Inc.

**UNION CARBIDE**
Union Carbide Sales Company

*Units of*
**UNION CARBIDE AND CARBON CORP.**

*General offices*
30 East 42nd Street
New York, N. Y

UCC

*Sales offices in*
Principal cities throughout the country

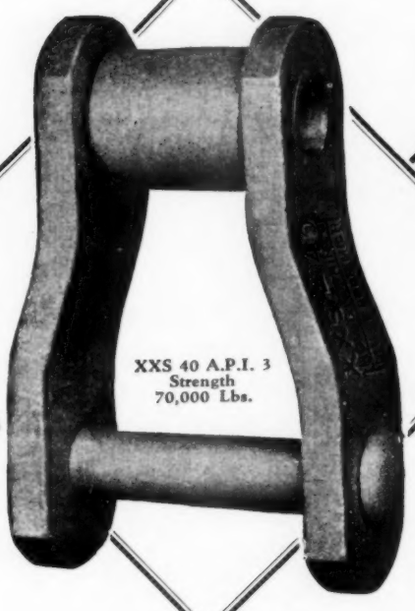
*65 Linde plants—48 Prest-O-Lite plants—174 Oxygen Warehouse stocks—156 Acetylene Warehouse stocks—42 Apparatus Warehouse stocks—245 Carbide Warehouse stocks*

# HOWE CHAIN

All good products have that essential thing called "balance." In the Howe XXS Chain, balance makes it the strongest chain yet developed. The proper balance between design, material and workmanship enable this rotary chain to stand the shocks and impacts resulting from sudden changes of speed and over-loading.

Howe Chains are made by chain specialists who are authorities on materials and construction. Heat treated chrome nickel steel is used throughout. The bushings and pins are press fitted into the sidebars. Alloy steels are particularly adapted to heat treatment and greatest strength and wear values are assured. The press fits increase durability and prevent wracking of parts.

*Write for details of this strongest rotary chain made.*



XXS 40 A.P.I. 3
Strength
70,000 Lbs.

## Republic Supply Company

**OIL AND GAS WELL SUPPLIES**

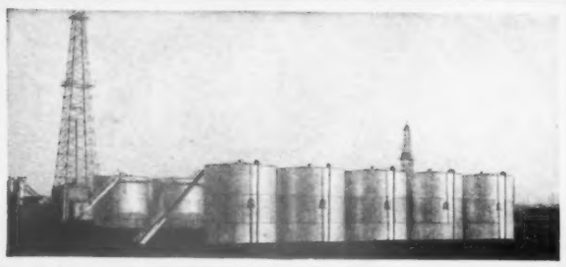
*Cable and Rotary Tools*

GENERAL OFFICES: HOUSTON, TEXAS

PIONEERS

# COLUMBIAN BOLTED STEEL TANKS

*Columbian Improved Recess Nut*



Columbian erected the first A.P.I. Bolted tanks in the field . . . . Today, Columbian bolted steel tanks dot the oil fields of the five continents!

—A fitting endorsement of a tank that has unconditionally met every oil field practice.

**COLUMBIAN STEEL TANK COMPANY**

EST'D 1894

1405-1625 WEST 12TH STREET KANSAS CITY, MISSOURI

CAPACITIES UP TO 27,500 BBS

FOR SAFETY—SPECIFY COLUMBIAN

Look for the triangle on the reel

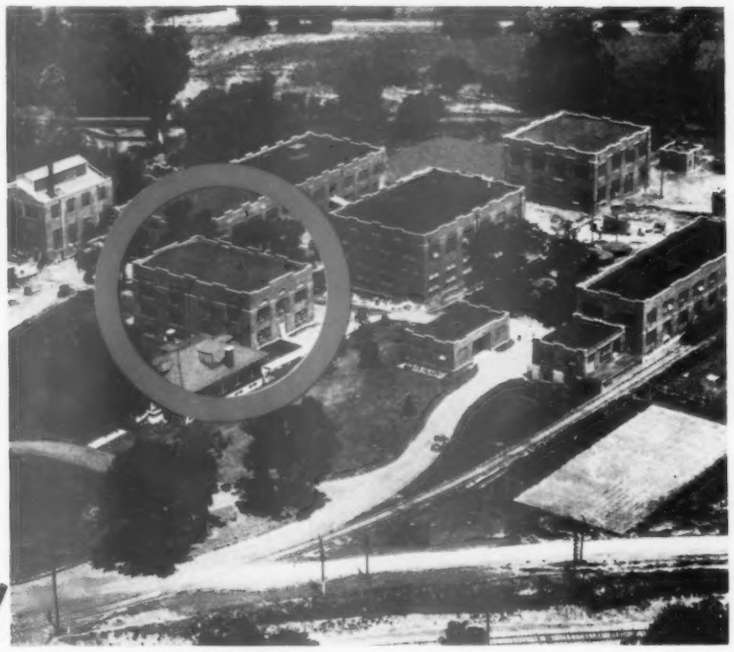
*For Strength and Uniformity Use*

WICKWIRE SPENCER STEEL CO.

**WICKWIRE SPENCER**
**WIRE ROPE**

**WICKWIRE SPENCER STEEL CO.**
*Home Office:* 41 East 42nd St., New York City
*Branches:* San Francisco, Los Angeles
*Also distributed by*
WICKWIRE SPENCER SALES CORP.
Seattle, Wash. Tulsa, Okla. Portland, Ore.

T. T. Word Supply Co., Houston, Texas Acme Tool Co., Breckenridge, Texas Lucey Products Corp., Tulsa, Oklahoma
Standard Supply & Hardware Co., New Orleans, La. A. F. Keck & Co., Butler Pennsylvania



# THIS Laboratory grew from a real necessity of the Petroleum Industry ✣

The laboratory indicated by the circle on the above view of the Tret-O-litE plant wasn't built just for fun. Wm. S. Barnickel & Company spent the money necessary to erect and equip this laboratory, and to man it with expert research chemists, because such facilities were absolutely essential to handling the cut oil problems of the petroleum industry.

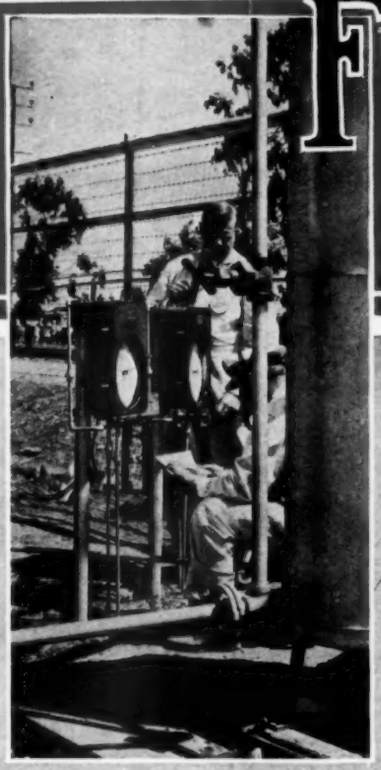
As manufacturers of Tret-O-litE · · the first, the most extensively used, the most thorough and the most economical method of treating cut oil · · we have recognized that it is our duty to know all that can be known about cut oil.

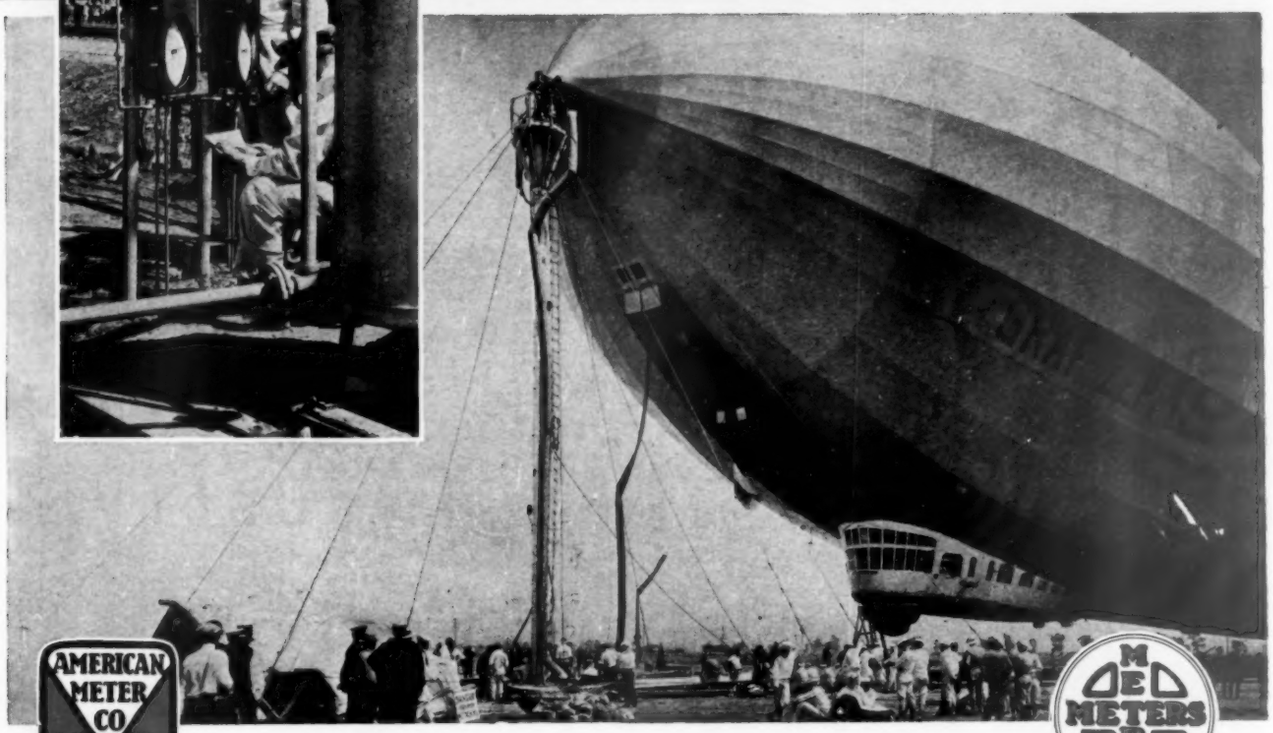
In every oil district are Tret-O-litE representatives ready to bring to your lease, at your request, the facilities and accumulated experience of the Wm. S. Barnickel & Co. organization.

WM. S. BARNICKEL & COMPANY
ST. LOUIS, MO.
Offices and Plant, Webster Groves, St. Louis County, Missouri

Tret-O-litE
Reg. U. S. Pat. Off.

# FUEL FOR THE GLOBE-CIRCLING GRAF-ZEPPELIN *must be proportioned and measured with great accuracy*





AMERICAN METER CO
MEASUREMENT ENGINEERS
CUBIC FEET

Large photo above shows Graf Zeppelin taking on gas fuel at Los Angeles during round-the-world flight . . . Inset shows Westcott Orifice Meters used to insure accurate mixture of 36% natural gas and 64% Pyrofax.

MADE METERS

ON her recent spectacular flight around the world, the Graf Zeppelin used gas fuel in her engines. Approximately 175,000 cubic feet of gas were taken aboard at Los Angeles, where refueling required about 12 hours. Throughout this period it was necessary to mix absolutely accurate proportions of natural gas and Pyrofax. Two 50-inch Westcott Orifice Meters were used to secure the exact control required.

Two Westcott Orifice Meters were used in a similar set-up for refueling at Tokio. This, the dramatic world-flight, furnishes further evidence of the part played by the products of American Meter Company in the industrial and technical achievements of the day.

WHEREVER ACCURACY IS ESSENTIAL, USE

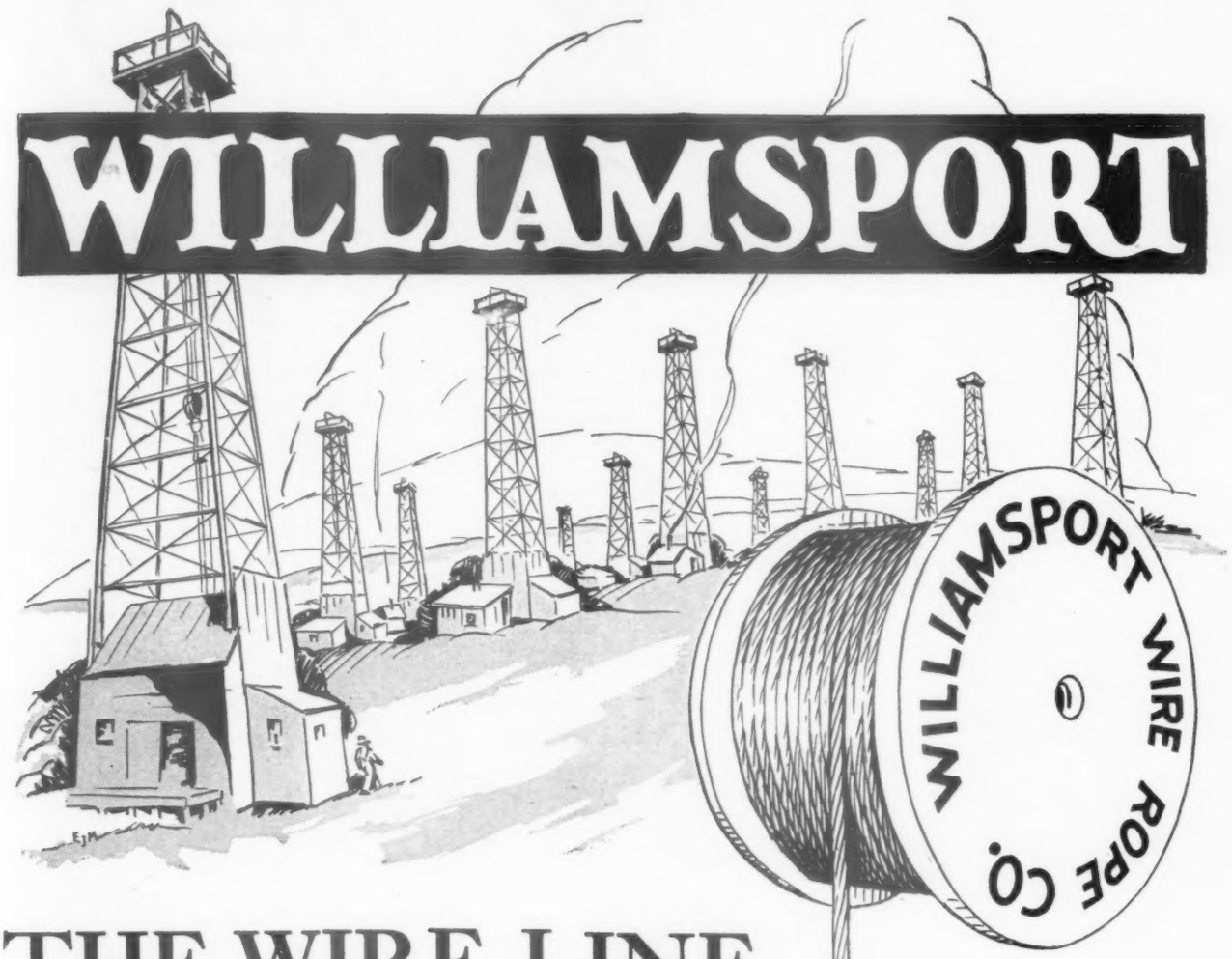
# METRIC orifice METERS

**METRIC METAL WORKS**
*ERIE, PENNSYLVANIA*
*IRONCASE, TINNED STEEL CASE and ORIFICE METERS*

**AMERICAN METER COMPANY**
INCORPORATED
*The World's Largest Manufacturers of Gas Meters and Allied Apparatus*
*ESTABLISHED 1836*

*Sales Service:* Erie Dallas Tulsa Denver Los Angeles San Francisco Kansas City Pittsburgh Chicago Philadelphia New York Baltimore Boston Albany

# WILLIAMSPORT




# THE WIRE LINE *Good* Drillers Prefer

**Wherever you find a competent man—you'll generally find him using competent tools.**

**This is as true in the Oil Fields as anywhere else.**

**We honestly believe that a Williamsport line in the hands of a good driller will give—long enduring satisfaction and greatest economy.**

**Try it and prove this to your own satisfaction.**

**WILLIAMSPORT WIRE ROPE CO.**

Main Office and Works: Williamsport, Pa.

*General Sales Offices:* 122 S. Michigan Ave., Chicago, Ill.

OIL COUNTRY SALES OFFICES:

Williamsport Bldg., Fourth and Midland Valley Tracks, Tulsa, Okla.

*Distributed by* the Bridgeport Machine Company, Wichita, Kansas, and all of their Mid-Continent Branches

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| Houston | Pampa |
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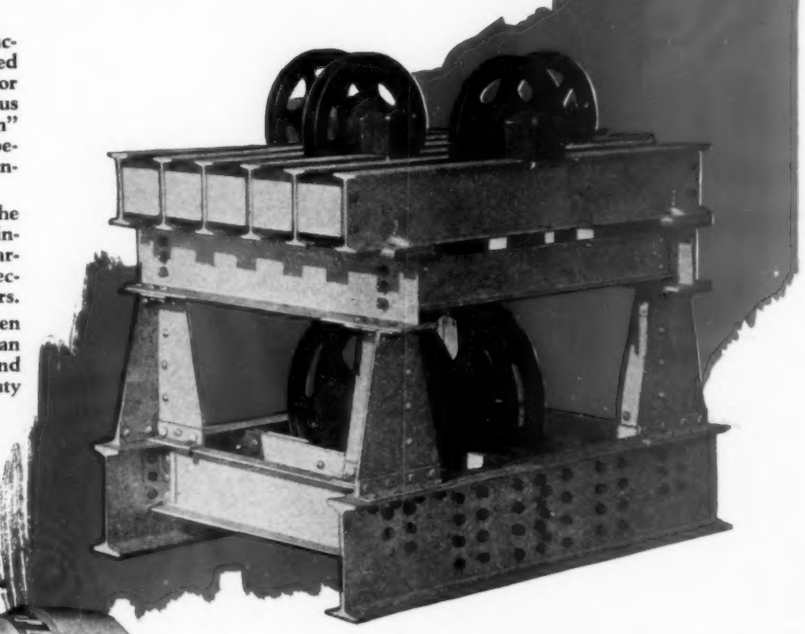
| Shidler | Wink |
| Casper | Lewistown |
| Blackwell | Seminole |
| Ardmore | Odessa |
| Oklahoma City | Maud |

Hobbs, New Mexico

# INTERNATIONAL *turns to* *American Roller Bearings* *in building their newest crown and traveling blocks*



AS a distinct forward step in their manufacturing progress "Ideco" has announced the adoption of American Bearings for their newest crown block. This company thus becomes another member of the "All-American" team of drilling equipment manufacturers because their Boykin Division has been Americanized for some time.

The list of "All-Americans" below is the "Who's Who" of equipment makes in this industry. Their judgment recommends these Bearings for all heavy duty. And the Bearings recommend the products to the buyers and users.

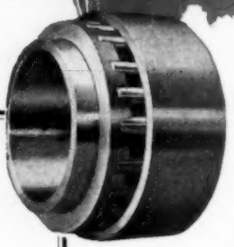
The better results from Americans have been well broadcasted. Station A.R.B. is receiving an ever-increasing number of fine comments and fine orders for "The standardized heavy duty roller bearing of the Oil Country."

**AMERICAN ROLLER BEARING CO.**
PITTSBURGH, PA.

*Pacific Coast Representatives*

Frank M. Cobbledick Co.
1031 Polk St.
San Francisco, California

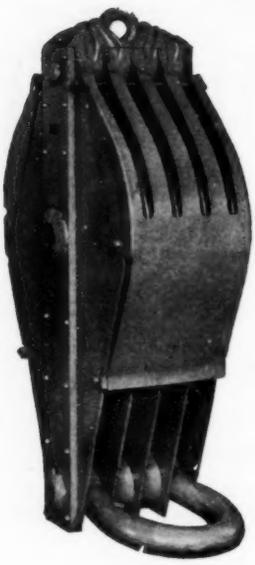
Edward D. Maltby Co.
321 W. Pico St.
Los Angeles, California



## OTHER USERS OF

AMERICAN ROLLER BEARINGS HEAVY DUTY

AMERICAN WELL & PROSPECTING CO.
BOYKIN DIVISION, INT. DERRICK & EQUIPMENT CO.
DOHENY STONE DRILL COMPANY
FRANKLIN VALVELESS ENGINE CO.
HOPPER MACHINE WORKS
INTERNATIONAL DERRICK & EQUIPMENT CO.
LATEX IRON & STEEL WORKS, INC.
LEE C. MOORE CO.
LUCEY MANUFACTURING CORP.
NATIONAL SUPPLY COMPANY
OIL WELL SUPPLY CO.
STAR DRILLING MACHINE CO.
PORTABLE RIG CO.
T. T. WORD SUPPLY CO.



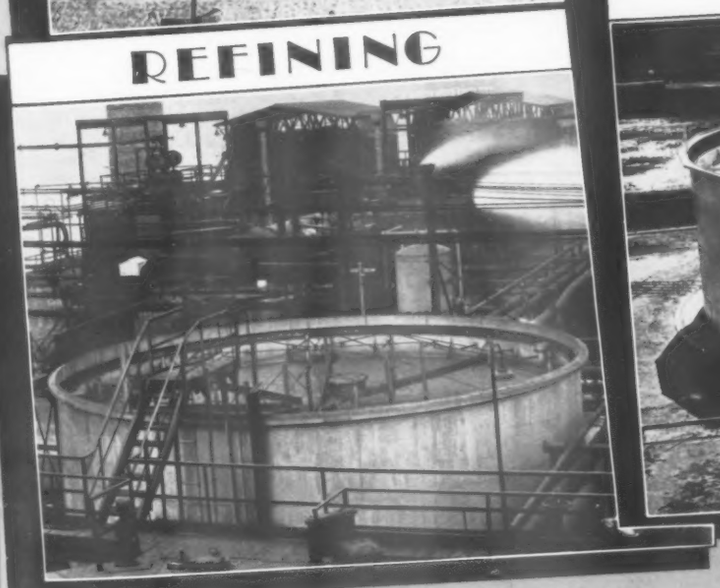
# AMERICAN HEAVY DUTY ROLLER BEARINGS

# Stop Evaporation to CONSERVE Natural Resources *and also* Your Investment *in*

PRODUCTION

TRANSPORTATION

REFINING



DISTRIBUTION

Top: Breather Roof on crude tank and Floating Roofs on pipeline tanks. Bottom: Floating Roofs on refinery tank and on marketing tank at Calcutta, India.

## Equip tanks for all purposes *with* WIGGINS ROOFS

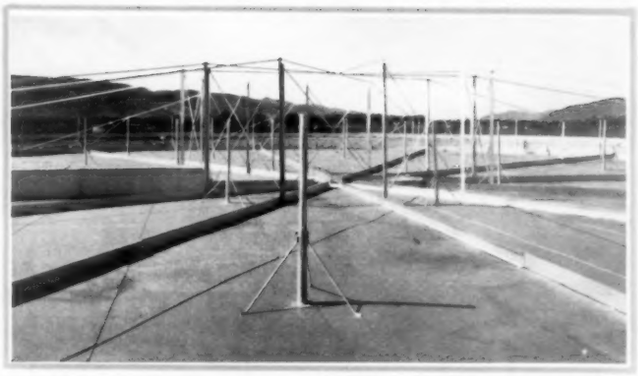
*Turn the page for details*

# STOP
# EVAPORATION LOSSES

## *from working tanks with WIGGINS FLOATING ROOFS*

The experience of oil companies all over the world has shown that Wiggins Floating Roofs for working tanks pay for themselves in short periods and pay big dividends thereafter. The roof rides on the liquid at all levels, keeping air from coming in contact with the oil. By stopping the loss of light fractions of the oil, these roofs prevent the reduction of gravity—and consequently the price level—of the oil or oil products remaining in the tank. Fire hazard is also eliminated.

Do you know what *your* annual evaporation losses are? Ask for our booklet giving evaporation loss tables. We will also be glad to send you quotations on Wiggins Roofs for new or existing tanks.



*View across the center of a Wiggins Floating Roof showing trussing of deck.*

## *from standing storage with WIGGINS BREATHER ROOFS*

Loss of valuable vapor from standing storage tanks with ordinary cone roofs is caused by thermal expansion, which forces vapor out through relief valves and draws fresh air in to carry away more vapor. Wiggins Breather Roofs reduce this loss to practically nothing, by flexing up and down as the temperature changes the vapor volume in the tank.

When used for standing storage on full tanks, Wiggins Breather Roofs take care of all breathing and no vapor is vented from the tank. They are not limited to this type of service alone, however, for even on tanks that are not full all the time Breather Roofs show considerable savings. Ask for a copy of our booklet containing savings tables.

*View across center of a Wiggins Breather Roof in down position.*

## *Other Products*

Be sure to get our price when installing the following: *Oil storage tanks* of all sizes; *Elevated tanks* for water or other liquids; *Hortonspheres* for pressure storage in 5,000 to 10,000 barrel capacities; *Refinery Equipment* such as Agitators, Stills, Condenser Boxes, Bubble Towers, etc.

*Two Agitators*

**CHICAGO BRIDGE & IRON WORKS**

CHICAGO NEW YORK DALLAS SAN FRANCISCO CLEVELAND
DETROIT BOSTON PHILADELPHIA BIRMINGHAM

Chicago Bridge & Iron Works
Old Colony Building, Chicago, Ill.

Gentlemen: Please send me information on the product checked:

☐ Wiggins Floating Roofs ☐ Elevated Steel Tanks
☐ Wiggins Breather Roofs ☐ Oil Storage Tanks

Please send me a quotation on_____

_____

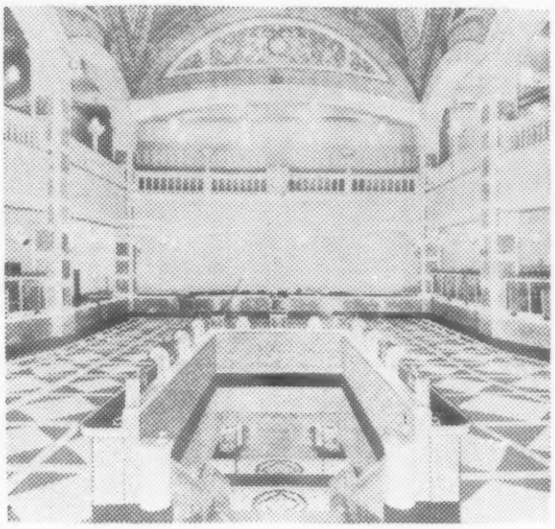
Name_____ Title_____

Company _____

Street_____

City_____ State_____

WIGGINS ROOF
Stop EVAPORATION LOSS



# Sinews *of* Service

**The robust character of commercial life today offers a parallel — in scope vastly multiplied — to the bustling trade of Houston when this bank was formed fifty-three years ago. The importance of personal contact with executives has grown in importance as the bank has developed services based on "sound money" and common sense. And underlying our present prosperity is a new conception of industrial co-operation.**

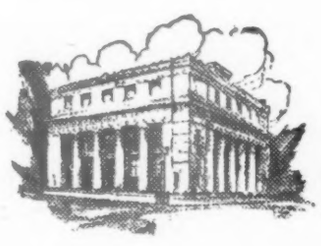
A sympathetic understanding of the great Texas oil industry in all of its many phases has enabled this bank to render valuable service to the industry over a period of years. How can we help your particular problems? Please feel free to consult our official family without obligation.

## *Thinking in Co-operative Terms*

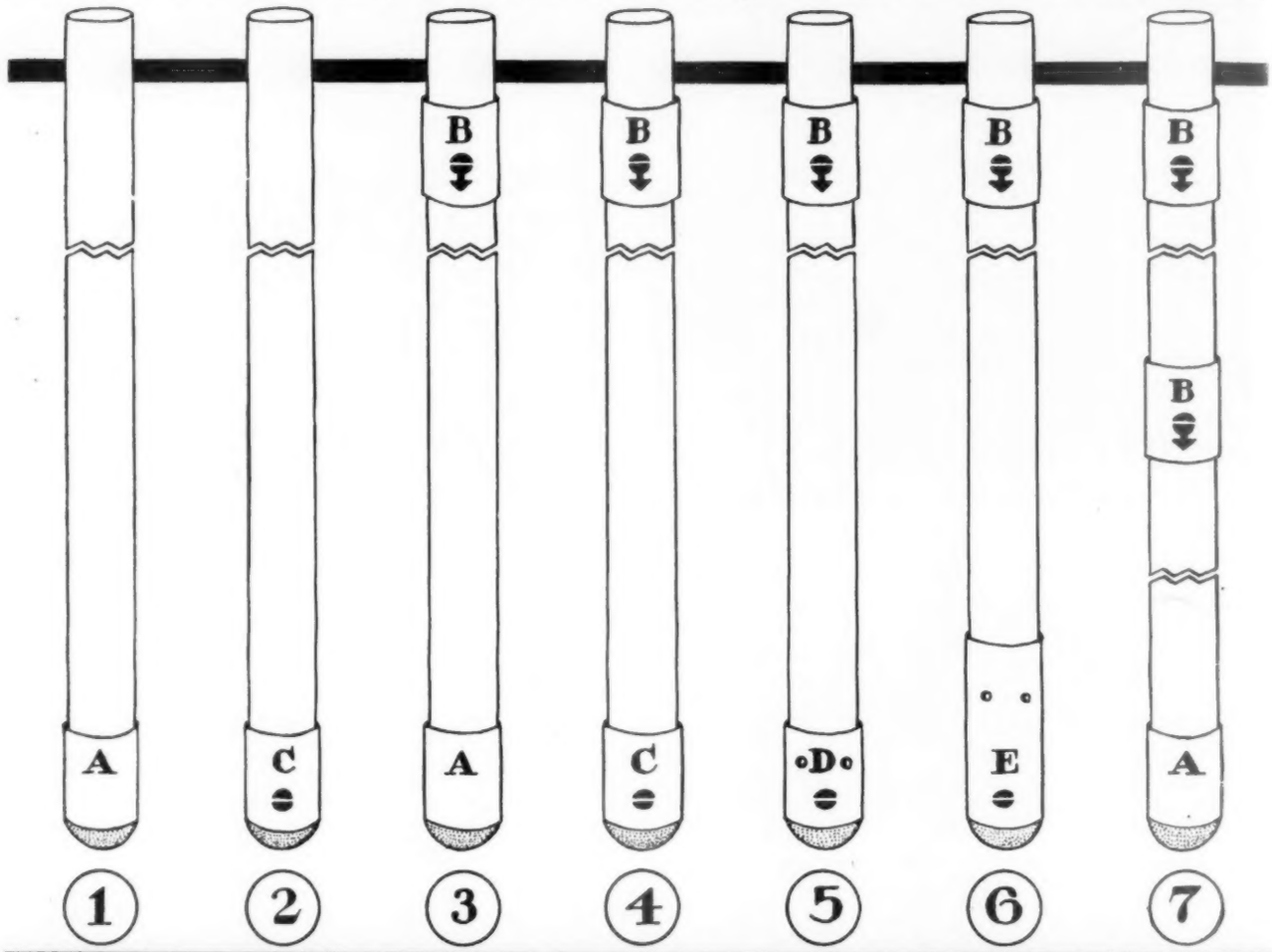
In spite of the increased competition, there is a growing realization of the importance of maintaining a free flow of commercial and industrial information. This is being accomplished by a closer relationship between industries, between government and business and between the shareholder and the corporation . . . and the modern commercial bank plays an important part in this movement. In addition to the efficient performance of its technical duties, the Houston National endeavors to understand the business problems of its customers and to apply to them intelligently its knowledge of current conditions and the experience gained through many years of industrial and commercial contacts.

## HOUSTON NATIONAL BANK

**Main at Franklin**



Combinations of BAKER CEMENT EQUIPMENT in Common Use




# Adapt Baker Cement Equipment To Your Purpose With This Assurance—IT'S SAFE

A—Cement Guide Shoe
B—Cement Float Collar
C—Cement Float Shoe
D—Side Hole Cement Float Shoe
E—HIGH Side Hole C. F. S.

The plain line drawing above shows a few of the many ways in which various operators combine Baker Cement Equipment for Floating, Guiding, and Cementing.

Various areas have different methods, but they have one thing in common—they all use Baker Cement Equipment, for they know from experience that it is the one completely satisfactory answer to their Floating, Guiding, and Cementing problems.

*Export Sales Office:*
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## TABLE OF CONTENTS

### *Special Features*

The Texas Pipe Line Law ... 55
*By R. L. Dudley*

Interview With Sir Henri Deterding ... 56
*By Roy E. Leigh*

Proration and Its Effects in the Yates Pool ... 58
*By R. W. Richmond*

Refiners Favor Curtailment Sponsored by Oil Board ... 59

Economic Position of California in Movement of Oil to Atlantic Seaboard ... 61
*By Brad Mills*

California Halts Tank Building ... 63

Long Line Across Texas Most Modern Construction ... 64
*By Jack Logan*

Protection of Buried Pipe Lines ... 65
*By Stanley Gill*

The Year in Traffic and Transportation ... 67

Texas-Empire Line Increases Capacity ... 69

High Pressure Oxwelded Line Across Hudson River ... 70
*By R. W. Boggs*

North Texas, West Texas, Central Texas Storage ... 72

California Line Builders Were Busy During Year ... 75

Extensive Gas Line Construction in Rocky Mountains ... 81

Little New Line Work in Oklahoma-Kansas ... 87
*By Warren Baker*

Curtailment Tendency Halts Tank Building in Mid-Continent ... 88
*By Warren Baker*

California Storage Building Slow ... 95
*By Brad Mills*

In South America It's a Matter of Rolling Your Own ... 99
*By Roy E. Leigh*

Diaphraghm or Breather Roof for Oil Storage ... 107
*By Ludwig Schmidt*

Aerial Photography Facilitates Pipe Line Location ... 179
*By Jack Logan*

Salt Water Disposal Line Coated Inside and Out ... 184
*By Warren Baker*

Welded Tanks Becoming Popular in California ... 211

Developments in Pipe Line Welding Practice and Equipment ... 248
*By H. L. Kauffman*

REGULAR DEPARTMENT AND NEWS BEGINS ON ... 215

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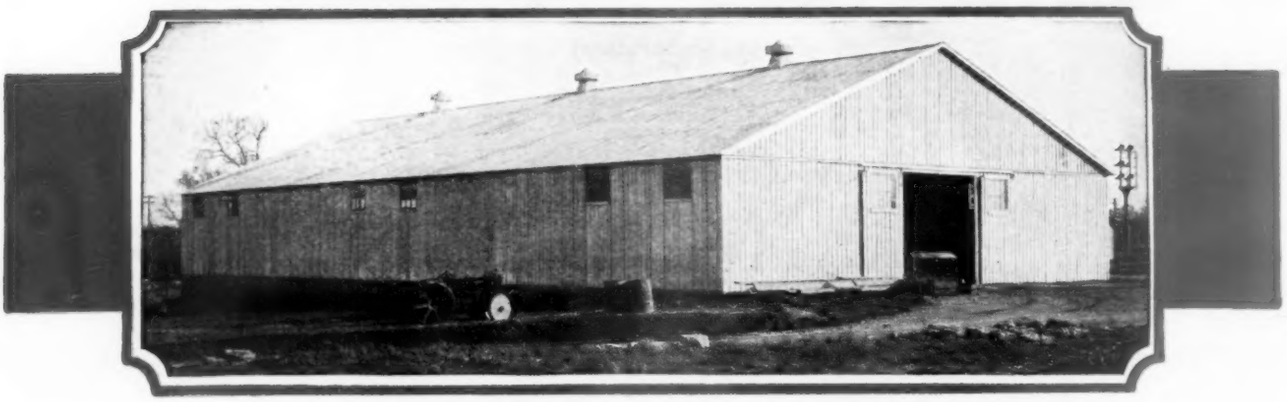

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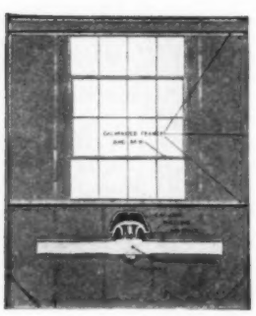

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# The Texas Pipe Line Law

By R. L. DUDLEY
*Publisher*

JUST what will be accomplished by the new Texas Pipe Line law passed by the Texas Legislature last week? Will it be a panacea for the ills from which the oil industry is suffering in Texas, or will it prove ruination to the pipe line companies and purchasing companies at which it was aimed.

These are questions of interest to every oil man in the state, whether he be independent or "big company" employee.

THE OIL WEEKLY has never been given to participation in factional fights within the industry. On the other hand it deplores them, whether they be started by independent or major. But we have always reserved the right to say what we please when we please.

IT is too soon, of course, to say just what will be the result of the new law. Section 4 of the bill really contains the powder and how strong that powder will be cannot be determined until the "rates and regulations" provided for are adopted by the Texas Railroad Commission. The most immediate result, as we see it, will be a series of conferences between oil men and the Railroad Commission at Austin and it is doubtful whether the complete tariffs, storage charges, interpretations, etc., by the commission itself, will be finished within 60 days to three months.

And then the real test of the law will come. If the pipe line companies take the position that the law is unreasonable and unconstitutional, then the matter probably will be in the courts for months, possibly years.

AS we see it, the new law provides for three major things which were not in effect before the law was passed:

I.—It makes purchasers "common purchasers," providing for proration of purchases. In many fields this has been done as a matter of custom and agreement, but in other fields, notably the Panhandle of Texas recently, large purchasing companies have favored themselves in runs. This provision of the bill would put every producer on the same theoretical basis. In this connection, The Oil Weekly has always felt that a pipe line company, if it is to enjoy the privileges of a common carrier (right of eminent domain, etc). should also stand the duties of a common carrier, but it is interesting to note that there is a difference between providing a facility to move oil and actually buying the oil—the difference between a carrier and a producer-purchaser. This is a point that doubtless will be contested at law.

II.—The new law allows the railroad commission, after evidence, to require the extension of pipe lines and facilities, provided such extensions are reasonably required and do not impair the ability of the company to perform its duty to the public. Undoubtedly one immediate effect of the law, if it is declared constitutional, will be the extension of certain trunk lines to terminals, lines which now practically end in pastures. However, it is well to note that while some of these before mentioned trunk lines are not owned by the pipe line company to terminal points, there has been no difficulty in moving oil from the "pasture points" to terminal points.

THEORETICALLY, this extension of lines and terminal facilities will permit inland independent producers to move cargoes at seaboard, but we seriously doubt if such practice will be extensive. One thing it may influence will be the construction of more independent refineries on the Gulf Coast, refineries owned by companies having no pipe line affiliation.

It is to be noted again, however, that the section above referred to leaves a lot to interpretation and execution. In the past we have had little difficulty in getting new pipe lines constructed—there has always been some company ready to go in as soon as the oil was in sight. A question we would ponder on right now, is, under the new law, *does the Railroad Commission have the right to restrict the number of lines going into a section—and what will this lead to?*

III.—The law provides that the Railroad Commission shall fix tariff rates itself, fix storage rates, set the length of time storage shall be used, develop equitable storage agreements, etc.

And from the standpoint of the pipe line companies themselves, the law makes possible action on the part of the railroad commission fixing the rate of maximum profit to be earned by the pipe line company.

In the opinion of The Oil Weekly this is a dangerous thing and cannot fail to have a bad influence on other legislation and other industries if held constitutional.

In our summary above we have dealt with the results of the law specifically, with impartiality. As to what good it will accomplish for those who proposed it, we believe that the good will be negligible, but it does have some dangerous phases.

The best test of the fairness of a law is to inquire if those who propose it would be willing to take the other side of the fence and advocate it. We do not believe that the producers who supported this law would be willing to have the same regulatory effect placed on their businesses that certain sections of the law place on the pipe line companies.

In the final analysis, continued storage of oil will aggravate the oil situation and not aid it for more than a most transient period.

The problem of the oil industry in Texas and elsewhere is to restrict production, whether this is done by proration at the wells, or by a restricted drilling campaign.

*California Crude Price Increased*

(*See page* 215 *for details*)

**THIS issue is especially devoted to Transportation and Storage of Oil and Gas.**

**It also features the California Oil Equipment and Engineering Exposition, and includes a mechanical description of the new and improved drilling and production equipment on display at Los Angeles.**

IF AMERICAN PRODUCERS PROCEED ON THE

BASIS OF

# "AFTER US, *The* DELUGE"

## Then They Must Expect the Deluge

SIR HENRI DETERDING TELLS THE OIL WEEKLY

*In an interview with*

ROY E. LEIGH

*Special Foreign Representative*

LONDON (By Mail)—It was my privilege recently to interview Sir Henri Deterding, K. B. E., Managing Director of Asiatic Petroleum Company, Ltd., and Bataafsche Petroleum Maatschappij and director of other units of the Royal Dutch-Shell Group, on some of the most important subjects now confronting the oil industry. Sir Henri, who was seen at his office in St. Helen's Court, London, talked freely, always with perfect candor. He did not hesitate to express decided views on such diverse subjects as were brought up in a discussion ranging in locale from the Pacific Coast to the Caspian Sea. The walls of his office are hung with maps, to which he frequently referred to illustrate his points wits respect to the oil geography of the world.

Sir Henri, who displayed a keen insight into American affairs, remarked that he had visited the United States twice during the last year. He frequently employed phrases recognizable to one familiar with his Chicago speech[1]; and indicated that the opinions there expressed lie very close to his heart. When asked for an opinion regarding the probable success of curtailment schemes now being advanced in America, he said, significantly, "If you continue to follow the policy of apres nous le deluge, then you must expect the deluge!"

He expressed disagreement with those who, in recent public utterances, have voiced a boundless faith in the inexhaustible extent of America's petroleum resources. Repeating from his Chicago speech, he remarked that too many people forget that, while new fields may still be *discovered,* they can never be *created.* "The more oil you find now, the less there will be left for future discovery and future needs. Producers who refuse to conserve their resources during times of stress remind me, let us say, of a band of sailors ship-wrecked on an island with only a certain amount of food. How absurd it would be if they should say 'Come, let us eat all the stores now and fill our bellies full,' with no assurance of rescue or of having their supplies replenished in future!"

Seizing a piece of paper, he drew an erratic line of peaks and valleys representative of the fluctuations of American oil production. Then he drew a straight line representative of an ideal condition of balanced supply and demand. "We realize, however, that the ideal is impossible of achievement. Let us, therefore, strive to approach it as nearly as possible," said he, drawing a gentle undulant curve to indicate a policy by which production activities would be increased and decreased from

[1] "Common Sense in the Oil Industry," Tenth Annual Meeting, American Petroleum Institute, December, 1929.

# Shell Group Ready *to* Cooperate *in* Any Plan for Reducing World Output

time to time in response to increasing and fluctuating demands.

Recalling an anecdote in connection with his last visit to the United States, he said that shortly after the Chicago speech he found himself in a group of Americans who sought his further views on current affairs, one of whom said: "Your theory of conservation is all very well; but, come now, tell us what is your real purpose? What have you got up your sleeve, or in the back of your mind?"

At this point his eyes began to twinkle. "'My real purpose,' I told him, 'is to give you fair warning; so that, when you have exhausted your own petroleum resources, I can charge you six dollars per barrel for imported crude and you will have no right to complain!'"

Later in the conversation, he said that oil is almost as necessary as bread, in modern civilization. "People may one day cry tears of blood for what is now despised as excess production!"

### Willing to Cooperate

Sir Henri repeated that the Shell Group is willing to cooperate fully with its neighbors in American fields for the carrying out of any plans which may be adopted in effort to correct chaotic conditions now obtaining.

Regarding the restriction of Venezuelan production, Sir Henri admitted that there is already some cooperation toward that end. "However, it means no more," he said, "than if you and I should covenant with each other to walk no faster than four or five miles per hour when we leave our offices tonight." Pondering that statement, one recalls that the average pedestrian can walk but little faster.

He was thereupon questioned specifically regarding recent negotiations looking toward a more drastic restriction of production in the Maracaibo Basin. "There may be something in the air," he said; "but no definite agreement has been reached."

"There are, in effect, three companies concerned in the production situation at Maracaibo. Let the others tell us what they want to do in the way of conservation. We will be willing to do whatever they are willing to do, provided it is truly reciprocal."

Sir Henri recalled a recent instance of the sale of a quantity of Venezuelan crude delivered at a deep-water point outside Maracaibo Bar for 57 cents per barrel, leaving the producer less than 40 cents return at the well. "It is nothing short of criminal," he said, "thus to impoverish the country of production and to create a disturbance in the markets of the country to which the cheap oil is consigned." As a further example of criminal waste, he recalled that at one time oil sold as low as five cents per barrel in Mexico, thus forcing into inferior uses a product which should have been conserved against a greater need.

### Shell Not Concerned With Tariff

Sir Henri indicated that, as a matter of personal belief, he is opposed to artificial trade barriers. "There is only one thing of any value in this world," he said; "and that is labor. Labor should have the freest possible scope. Man should have the opportunity of selling or exchanging the product of his labor in any market.

"However, if the American people want to surround themselves with a tariff wall, that is their business. It will not affect the Shell Group, since we export more oil than we import into the United States." Continuing, he explained that the enactment of a tariff law would simply bring about a diversion of Venezuelan oil from the Atlantic Seaboard to the European market, and of California oil to the Atlantic Coast.

"Americans should think twice, though," said he, "before introducing to the world any such scheme. It might develop into a case of—what do you call it? tit for tat? Yes; other countries might adopt it, thus restricting the market for your excess production."

### Not Alarmed at Threat of Russian Competition

Sir Henri was requested to give his opinion regarding the probable effect upon world markets of increasing Russian production, which, according to Soviet plans, is to be doubled during the five-year period ending in 1933. "The net effect of under-consumption," he explained, "is the same as that of over-production. In America, you have over-production. In Russia, they have under-consumption. Russia's domestic requirements are denied in order to provide a surplus for export. Oil sorely needed at home is exported in order to get money.

"The Soviets must have money, and the only real money they can get is in foreign countries. Russian money is only paper, with nothing back of it. You can spend or exchange American or English bank-notes any where; but the Soviets say, 'Our notes are only for internal circulation.'

"Russian tanks in the interior are bone dry. In America, in England, or elsewhere, the man in the street can buy as much gasoline or kerosene as he may require; but not so in Russia. If Russian industry, Russian agriculture, and the Russian people were permitted, they would consume all of their oil production at home. During the peak of Russian production, in pre-Bolshevik times, not a barrel of liquid fuel was exported."

"But, Sir Henri, I understand that a new production record was established only last year——"

"Bah! Soviet figures! How can you believe them? Nobody can check their statements. If the truth were told, I would not be surprised to learn that Russian production is only about 60 per cent of that currently reported. I repeat, the actual peak of Russian production occurred in pre-war days, when not a barrel of liquid fuel was available for export."

"But, suppose they continue, as you say, to deny their own people in order to maintain exports, the effect upon outside markets will be the same?"

"Impossible! Bolshevism cannot last that long.

"Man is born with the recognition of a Supreme Being. Throughout history, no nation, no government, has survived after denying and defying God."

# "Proration" and Its Effects in the Yates Pool

By R. W. RICHMOND
*Umpire, Yates Pool*

PRORATION was first introduced in Texas in the early part of 1927, with the bringing in of the Yates-Pecos field, located in the county of Pecos and a small portion extending beyond the Pecos River into Crockett County.

Up to the time of the bringing in of the Yates field it has been the practice of companies interested in a new field to exert every possible means to produce as much oil, and run to the pipe line companies as was in their power to produce. The pipe line capacity out of the Yates field at the time of inaugurating proration was a big factor in bringing about the present plan of such a curtailment of production under proration, owing to the inadequate capacity of the pipe lines in the field to handle the vast amount of production of which the field was capable.

Proration, no doubt, has demonstrated clearly its worth to the producer economically. It has also given to the companies who maintain a petroleum engineering force a much better chance to study the best and most plausible ways whereby a greater amount of oil can be produced at a much lower rate of lifting cost per barrel, and at the same time with more regard to the conservation of the natural resources contained within the structure itself.

Had it not been for proration, no doubt this field would have taken on the same boom proportions that all other fields in the past have assumed in order to get the oil as fast as they could possibly withdraw it, besides not having any time for research work along the lines of petroleum engineering, along lines such as are being conducted at the present time, and that have been conducted heretofore from an economic sandpoint, and by the time the field had reached the point that there would have been time for such work as mentioned, the field would have reached a place where this work would have been useless, owing to the heavy withdrawal causing the rapid spread of water over the field, and the depletion of gas to such an extent that there would have been what might be termed, another boom, but a tubing and pumping equipment boom instead of a flush production boom.

It has been proven that by the slow and steady withdrawal of the oil from the structure, that it has been a big factor in helping to retard the water encroachment, therefore preventing it from channeling through the structure, which no doubt would have happened, as experience teaches us from conditions which have existed in other fields operated without proration, and no doubt the evidence in the Yates field would have been much more evident owing to the texture of the formation, the lime being very porous and crevises appear in a great number of wells throughout the field.

It has proven, or at least we believe that we have sufficient evidence to warrant the statement that it has been the means of a great saving in conserving the natural gas contained within the structure. By flowing of wells under chokes of various kinds the gas to oil ratio has been held down considerably lower than has been the practice in other fields, and is considerably below the average as oil field practice goes. In a test just completed on the 97 wells connected to the Humble Oil & Refining Company's gasoline plant in the Yates field, it was shown that the average gas to oil ratio is 337 cubic feet of gas per barrel of oil, which is very conservative compared to other fields in the state.

Tests being conducted in the field tend to indicate that this can be lowered considerably and eventually can be reduced down to 200 cubic feet per barrel of oil. This is being accomplished by the running of tubing into the wells and allowing them to flow only through the tubing instead of the casing, as has been the practice heretofore. All of which proration has made possible by giving to the companies operating in the field, more time for such scientific studies on actual conditions as they exist in the field.

By the slow and more even withdrawal of oil from the structure, there is, no doubt but that the ultimate recovery will be much higher than it would have been otherwise, as the lime will be cleansed more thoroughly of oil by the slow washing process, than if taken at a higher rate of flow.

There is much more useful information to be had from the Yates field, by further study of conditions. Every test conducted brings out new conditions and food for further thought; for instance, in the gas to oil ratio tests just completed, it has been shown very clearly just where the water drive from the edges of the structure is taking effect, and the extent of the water up into the structure, showing a very low gas to oil ratio on these wells. There are some of these wells located well down on the structure that only show a gas to oil ratio of 47 cubic feet per barrel of oil. Taking into consideration that the saturation of a barrel of oil at 700 pounds pressure is 150 cubic feet of gas, the above is far below a perfect gas to oil ratio.

As a whole proration has allowed considerably more time to be devoted to study and to experimental work, than could have possibly been devoted to it under boom conditions and open flow methods, not only from a production standpoint, but along the lines of gasoline content as well. Experimenting with gas and oil under pressures in the field has been made possible, which under other conditions would in all probability have to be conducted in a laboratory. Tests that have been made along "gasoline content" lines have shown that by the holding of 80 pounds pressure on the gas trap the gas will give a yield of 46/100 gallons per thousand, while by reducing the pressure on the same trap to 12 pounds a yield of 1.52 gallons per thousand cubic feet was obtained. The above pressure on the trap of 80 pounds was open flow test while the later test was under proration allowance on the well.

Arrangements are made to take gas content recovery tests, and at the same time to run gravity tests on the crude, under different pressures carried on the gas trap, to ascertain if, by holding a higher pressure on the trap, there is anything to be gained in the way of increasing the gravity of the oil materially enough to warrant the carrying of excessive pressures on gas traps. If this condition shows that there is nothing gained in the increase in gravity but that the gas momentarily goes back into salution, and then is allowed as soon as put into the tanks to weather off into the atmosphere, then this gas can be turned into dollars and cents by the carrying of lower pressures in the gas traps and getting the revenue from the gasoline itself.

Proration as a whole is a fair and equitable means of producing, as it gives the producer the same prorata chance that he would receive by the laws of nature, were there no proration, as the oil outlet is based solely on the size of the wells and the number of wells located in each 100-acre unit. This, at the time corrects to a certain extent the unnecessary drilling of additional wells. It makes a very efficient producing program for the least money expended, all of which makes proration and conservation closely allied to each other, when sifted down to basic facts.

# Refiners Favor Curtailment Sponsored By Oil Board

## Big companies claim gasoline stocks equal or below same period last year in telegraphed survey

CURTAILMENT of refinery operations pledged by American oil refiners following publication of the Federal Oil Conservation Board's letter sent to the governors of California, Oklahoma and Texas March 4 containing the suggestion that refiners adopt a six-day week in order to curtail production of gasoline, is definitely assured.

Following publication of the board's letter, The OIL WEEKLY got in touch with companies controlling 80 per cent refining capacity in the United States, in an effort to discover the concensus of the operating heads of these companies with regard to the plan.

In some cases, the plan has been adopted in its entirety; in the majority of instances, however, the results which the plan contemplated, will be achieved if companies continue policies publically announced shortly after March 4, when leading companies throughout the country announced that refinery runs would be reduced by the equivalent of one-seventh of capacity—which is the same result as would have obtained had plants been closed down Sundays, as suggested in the board's letter.

In reply to wires sent by The OIL WEEKLY, major oil companies and representative refiners either announced that their respective companies would curtail production by the equivalent of one-seventh of capacity, or had already made such announcements and merely wired confirmations of such announcements.

Continental Oil Company wires:

"We are operating at 50 per cent capacity which is 25 per cent less than running reported by American Petroleum Institute for 95 per cent of the refining capacity of the United States. We are sympathetic to the purpose of the Federal Oil Conservation Board's suggestion but consider we have more than met it. Our gasoline stocks on April 1, 1930, will not exceed stocks as of April 1, 1929, an amount only sufficient to meet our current needs."

It is significant that this communication, as well as others subsequently reported herein, emphasizes the fact that no abnormally large gasoline stocks are presently on hand. This is contrary to the general impression that gasoline stocks are at their highest level.

Effective March 9, Standard Oil Company of New Jersey assumed leadership in the country-wide effort at curtailment of gasoline output, with the announcement that it would reduce its refinery operations one-seventh in volume. Figured on a conservative basis, this means a reduction of nearly 50,000 barrels a day in crude runs to stills, or about two per cent of domestic runs.

Mid-Continent Petroleum Corporation, Tulsa, wires:

"We do not feel it practical to shut down our refinery Sundays, however, we have recently reduced normal operations 15 to 20 per cent, and we expect to continue on this basis until the situation justifies additional production. Our stocks are considerably less than at this time last year."

The Texas Company wires that "Mr. Holmes has previously made the following statement for publication: 'We feel that there are operating difficulties that make it somewhat difficult. We intend to look into the matter. Our large refineries are located in the South where it is more desirable, because condenser water in the summer is very warm, for us to run at normal capacities the year around and store the excess in the winter for our heavy market requirements in the summer.'"

Reduction already achieved is voiced in the wire from the Shell Oil Corporation.

"We are in sympathy with suggestions and recommendations of Federal Oil Conservation Board. Shell Oil Company has already taken steps in California to reduce its refinery runs to six-sevenths of normal intake. Shell Petroleum Corporation some time ago reduced runs in its Mid-Continent and Indiana refineries so that stocks of gasoline on April 1, 1930, will be substantially less than stocks a year ago; but we are still further considering the matter with a view to bringing refinery operations down in line with suggestion of the Federal Oil Board."

Vacuum Oil Company says: "Our crude runs have been only to the extent required to meet demands for lubricating products and we expect to continued on this basis."

### Indiana Stocks Less

Gasoline stocks of Standard Oil Company (Indiana) are less now than a year ago and current production is in step with demand, according to a wire issued through the president, E. G. Seubert.

"President Seubert states that notwithstanding the fact that Standard Oil Company of Indiana has been running only sufficient crude to meet requirements and stocks at present are less than for a year ago, they will start immediately reducing refinery operations by running materially less crude thereby manufacturing less gasoline. This action has been taken with the thought of contributing to the general good of the industry and conforming in principle to the Federal Oil Conservation Board's recommendation of a six-day week plan. Imports of gasoline into the United States by Standard Oil Company of Indiana and affiliated companies will also be materially less than originally planned."

Sinclair Refining Company plans to operate in conformity with the proposed general plan. Its wire says: "We are planning to operate in conformity with the policy of one day a week shut-down or its equivalent, and plan to manufacture only enough gasoline during the coming year to supply our distributing facilities. Our present stock of gasoline in six refineries totals 688,000 barrels which represents only 24 day's supply for our outlets. This is practically the same stock as for this time last year."

Adhedence to the board's plan in principle but not in detail, is voiced by Sun Oil Company whose communication says:

"It is not practical for us to entirely shut down our refineries on Sunday as most of our stills operate on 30 to 40 day cycles. We will limit our gasoline production to such an extent as will just enable us to produce sufficient to take care of sales of our branded products. Our gasoline stocks in storage are almost exactly equal to one month's average business."

### Pacific Coast

Adherence to the plan is voiced by leading Pacific Coast refiners.

Standard Oil Company of California wires that on March 5, announcement was made that this company's refineries would, effective of that date, operate its refineries on a reduced schedule.

"On March 5, we announced effective

immediately that we would operate our refineries on the equivalent of a six-day week by reducing the weekly runs of crude oil one-seventh and without laying off labor, or reduction in pay."

Shortly thereafter Associated Oil Company announced that it had sharply reduced its refinery runs to meet conditions in the industry. The reduction was made February 1, and amounted to more than one-seventh of the January runs.

General Petroleum Corporation announced a reduction of fully 30 per cent, February 1, and will be guided by actual needs in the future.

And several independents on the Pacific Coast who have recently reduced refinery runs, have announced that they will immediately make a reduction equivalent to one-seventh of their January runs.

Standard Oil Company of New York wires:

"We are entirely in sympathy with the purposes sought by the oil board and have been steadily reducing our output of gasoline at our Atlantic seaboard refineries; in fact operations at these plants are now about 80 per cent normal, and have been for some time."

E. B. Reeser, head of Barnsdall Corporation, and president of the American Petroleum Institute, is reported as having said: "The Federal Oil Comservation Board's suggestion is very constructive, and I believe the plan will be adopted generally, which includes Barnsdall."

The questions of varying requirements in different sections of the country is raised by W. T. Holliday, president of Standard Oil Company of Ohio, who said: "Refining is a continuous process and impossible to operate on a six-day week. The suggestion must mean that runs be cut one-seventh. I suggest that on investigation, excess inventories of gasoline will be found to be localized in Oklahoma and California. It seems hardly reasonable to expect Eastern and Central refineries to cut their runs below their own requirements in order to take care of over-production in other sections of the country."

National Refining Company, Cleveland, directly opposes the plan both in word and in principle, on the theory that it is impractical, and on the premise that the refining industry has capacity to run more oil in six days than it is now running.

Adherence to the plan as the basis of good citizenship, is suggested by H. B. Earhart, president of the White Star Refining Company, Detroit. He says:

"In the light of the fact that the petroleum industry produced substantially a half-billion more gallons of gasoline in 1929 than the public could or would use, it would seem that good business and good citizenship would require refiners collectively, if legally permissable, if not individually, to reduce runs to meet the ample needs of the public, and conserve the remainder of this vital national resource for the future."

# Oklahoma Meetings to Consider Proration Extension

TULSA.—When Carter Oil Company, operators of 385 producing leases and 2050 wells in Oklahoma and Kansas with a potential of slightly in excess of 70,000 barrels per day, shut down for the 24 hours over last Sunday, it produced but 1065 barrels.

Under present proration figures the company is given an allowable production of 46,000 barrels and of its own free will has adopted the Sunday shutdown program as a means of aiding the petroleum industry. Most of the small amount of oil produced was made from properties owned with partners and where the partners do the operating and on properties making an excessive amount of water. Not a barrel of this oil was produced in the greater Seminole district.

***Wichita.—Kansas operators in meeting at Wichita, Monday, March 10 voted a 50 per cent curtailment program for the Voshel Pool, which allows the wells to produce 15,000 barrels a day. This agreement was reached in an evening session following an all-day conference.***

Gasoline plants were shut down to minimum and operated only to the extent necessary to supply fuel for its own camps and contracts made with other companies. Oklahoma Pipe Line Company, also a subsidiary of the Standard Oil Company of New Jersey, did not pump a barrel of oil during the 24 hours. This policy is to be continued by the two companies and others are expected to follow the plan.

Prairie Oil and Gas Company has given orders to extend the Sunday shut down movement as far as practicable to all of its activities. This company was one of the first to adopt the plan in February, 1929, and has continued it in some localities since that time.

Producers and Refiners Corporation, subsidiary of the Prairie Oil and Gas Company, has adopted the suggestion of the Federal Oil Conservation Board to reduce refinery and natural gasoline plant operations one-seventh.

Several meetings of oil men have been called for this week in Oklahoma and Kansas for the purpose of fixing the production outlet of the two Mid-Continent states for the next few months. There seems to be little or no doubt that operators will agree to continue the heavy restriction of crude oil production.

On March 14, a committee of Oklahoma oil producers and members of the Mid-Continent Oil and Gas Association will meet to determine the crude oil demand from Oklahoma after March 31, when the present conservation program expires. This meeting will be an executive, and refineries and pipe lines are expected to make known their current oil needs, and a general canvass of the situation will be made.

Three days later, on March 17, all of the oil producers of the state are to be asked to attend a meeting and approve or disapprove the recommendations of the committee.

Late in 1929, the same committee studied the situation and reported on the probable demand for January, February and March, 1930, which schedule was adopted and employed until the crude oil price cut on January 15 and 16, when by arbitrary methods it was agreed that the demand from Oklahoma was smaller than estimated by the committee and heavier restrictions on crude oil production were agreed upon. It was the aim then to cut to 600,000 barrels, which figure has never been reached. Last week the state came very near reaching this figure when it produced 604,000 barrels per day.

The differences in the proration of the new Konawa pool, southern Seminole County, Oklahoma, have been ironed out and harmony again exists among the operators. Production is being prorated 75 per cent of its potential output. Conferences were held at Tulsa and at Enid, Oklahoma, with Champlin Refining Company and other operators to settle the disagreements.

### Kansas Program Considered

The future proration measures in Kansas oil fields were to be discussed at a meeting in Wichita Monday, March 10. Recent developments in the Ritz, Voshel pools of McPherson County and the Schurr pool of Rice County, indicated that these areas would be up for discussion.

Tom C. Johnson, umpire for Kansas, has stated that the upsetting of the Voshel pool proration order by Derby Oil Company, is not exactly correct. He explained that this company did refuse to approve the recommendations of the operators committee to further accept the 25 per cent allowable and 75 per cent proration plan, desiring a 50 cent curtailment. Under the Voshel pool agreement the field is allowed to be prorated not less than 50 per cent or more than 75 per cent, with the operators committee authorized to increase or reduce the amounts. It started the proration there at 75 per cent.

At a meeting in Wichita last week the committee voted that the 75 per cent proration be continued during March and April, which was not agreed to by A. L. Derby, president of the Derby Oil Company; consequently he took the larger per cent figure as his basis.

*Group of loading terminals on Los Angeles Harbor. 1—Union Oil Company. 2—Shell Oil Company. 3—The Texas Company. 4—Hancock Oil Company*

# Economic Position of California

## *Moving Oil to* Atlantic Seaboard

By BRAD MILLS
*Staff Representative*

WHEN California petroleum products began to appear in increasing quantities along the Atlantic seaboard several years ago, there was an immediate realization that the economic structure of the industry was undergoing a distinct change. The reception accorded the rapid increase in shipments through the Panama Canal was viewed with a mixture of surprise, alarm and resentment.

California had been a little oil domain of its own for nearly 50 years, depending upon the Pacific Coast states and Pacific foreign countries to absorb its products, with a few odds and ends going to various world ports.

Periods of overproduction were weathered only with enormous losses, due to this very limited outlet. Crude oil prices dropped at times to 10 cents per barrel, and there was little demand for oil even at such a price. A spirit of restlessness prevailed among the agressive producers and marketers but they could think of no way to dispose of their surplus products. They were hemmed in, with rail shipments east and water shipments around South America out of the question.

Then came the Panama Canal and a much closer route from California to the Atlantic seaboard. A steady period of production, heavy demands from markets which had always absorbed its products and activity brought on by the World War kept California's attention turned away from the Atlantic seaboard for several years, much to the benefit of other districts.

It was during the overproduction of 1923 and 1924 that California turned to the Eastern part of the United States with a flood of crude and refined products. The Panama Canal certainly proved to be a handy strip of water and made it possible to ship almost every commodity with some degree of success. California marketers jumped into the new field with both feet and western products were soon to be seen and purchased in many eastern states.

Movement of California petroleum products to the Atlantic Seaboard is no more mysterious than is the shipment of Michigan automobiles, Ohio tires, Colorado canned goods, Michigan furniture and Texas potatoes to California markets. It is generally understood that various commodities may be shipped to any district that can absorb them, and it is largely for this reason that California has been sending large quantities of petroleum products to the Atlantic Seaboard.

The "encroachment" of California has been the subject of much discussion, particularly among marketers in other districts. There is no doubt but that every barrel of gasoline shipped to Atlantic points prevents some other district from enjoying a similar sale and lessens the demand just that much. The economic effect of California's shipments through the Panama Canal to Eastern states is very marked and has always been so since the completion of the nearer water route.

The preference of certain Eastern districts for California gasoline has become well known. Perhaps California distributors have been guilty of recommending their gasoline highly, but there is unmistakably a pronounced anti-

**TANKER SHIPMENTS FROM CALIFORNIA TO ATLANTIC PORTS DURING 1929***

| | Gasoline | Gas Oil | Crude | Fuel Oil | Diesel Oil | Lubricants | Kerosene | Total |
|---|---|---|---|---|---|---|---|---|
| January | 1,823,189 | 334,525 | ..... | ..... | ..... | ..... | ..... | 2,157,714 |
| February | 1,735,299 | 342,866 | 171,677 | ..... | ..... | ..... | ..... | 2,249,842 |
| March | 1,500,200 | 479,716 | 154,792 | 49,940 | ..... | ..... | ..... | 2,234,648 |
| April | 2,110,144 | 112,755 | ..... | ..... | 19,944 | ..... | ..... | 2,242,843 |
| May | 1,498,196 | 78,783 | 95,079 | ..... | ..... | ..... | ..... | 1,672,058 |
| June | 1,597,970 | 77,701 | 96,077 | ..... | 1,872 | 69,541 | ..... | 1,843,161 |
| July | 2,289,281 | ..... | 204,113 | ..... | 75,784 | ..... | ..... | 2,569,178 |
| August | 2,296,441 | 203,391 | ..... | ..... | ..... | 69,143 | ..... | 2,568,975 |
| September | 1,978,125 | 658,302 | ..... | ..... | ..... | 8,042 | ..... | 2,644,469 |
| October | 2,227,797 | 490,876 | ..... | 7,558 | ..... | 10,811 | 53,777 | 2,790,819 |
| November | 2,124,609 | 289,864 | ..... | ..... | 42,428 | ..... | 49,649 | 2,506,550 |
| December | 1,898,772 | 655,654 | ..... | 71,942 | ..... | 11,052 | 53,120 | 2,690,540 |
| Total | 23,130,023 | 3,724,433 | 721,738 | 129,440 | 140,028 | 168,589 | 156,546 | 28,170,797 |

* Exclusive of small quantity of package shipments.

knock quality in California gasoline. This preference has been a factor in the steady flow through the Canal for several years.

California's claim that its gasoline has marked anti-knock qualities is similar to Pennsylvania's contention that its lubricating oil is superior to the western product. Consequently, there is an almost unbelievably large sale of Pennsylvania lubricating oil in California, where western lubricating oil may be purchased at service stations at as little as 10 cents per quart. Much Mid-Continent lubricating oil is also sold in California.

Recently a prominent official of a large Gulf Coast oil company complained that California was breaking the back of the industry with its huge shipments to the Atlantic seaboard—a market the Mid-Continent and Gulf Coast has always believed to be their own. There is a good basis for such a statement and further increases in California shipments may be reflected in a still weaker Mid-Continent market.

### Company Connections

The close connection between Eastern and Western companies has been a leading factor in the movement of California products to the Atlantic seaboard. Six of the largest California companies have direct connections with Eastern companies, and in a few instances the Western company is a subsidiary of the Eastern company. Eastern capital has a good foothold in California and is fully awake to the possibilities of west-to-east shipments.

Heavy production of natural gasoline during the past two years has been responsible for increased movements of gasoline to the Atlantic seaboard. When blended with the straight run product it makes a fuel readily marketed in Eastern states. Five years ago, natural gasoline was not an economic factor, even in sales within the state.

Tanker shipments from California to Atlantic ports during 1929 totaled almost 30 million barrels. Gasoline was overwhelmingly in the lead, with 23,130,023 barrels. This does not include Gulf Coast shipments, which are directly in competition with Mid-Continent and Gulf Coast districts.

Several years ago the bulk of total shipments was crude oil. This was shipped to the large refineries along the Atlantic seaboard. South American crude has almost stopped the shipment of California crude through the Panama Canal. Only 721,738 barrels of crude was shipped by this route during all of 1929.

The overproduction period of several years ago also sent large shipments of fuel oil through the Canal to the Eastern states. Only 129,440 barrels of this commodity was shipped during last year. At one time Eastern fuel oil contracts held by California marketers was relatively important. South American fields have changed this arrangement in no uncertain terms.

Gas oil continues to move through the canal in good volume. Nearly four million barrels of this product was shipped during 1929. This is one commodity which has been marketed almost as fast as made in California, in contrast to the surplus of gasoline and fuel oil.

California partially "got even" with Pennsylvania and the Mid-Continent by shipping 168,589 barrels of lubricants to the Atlantic seaboard during 1929. Few claims have been made in the East for the lubricating qualities of California oil, so it looks as if the Western state will have to continue nettling other sections by sending more gasoline through the Panama Canal.

Late in 1929 kerosene was sent from California to the Atlantic seaboard. A total of 156,546 barrels, or three cargoes, was shipped. Kerosene has almost ceased to be an economic factor in Panama Canal shipments.

Shipments of Diesel oil were spasmodic, totaling only 140,028 barrels for the year.

When the first major curtailment movement was launched a year ago, an executive of a leading California marketing company made the public statement that California, in shipping large quantities of gasoline to the Atlantic seaboard, was ruining the market "on both ends" and that shipments through the Panama Canal should be reduced as the only sensible plan for placing the industry on its feet. There is a difference of opinion concerning this phase of the situation, however, and it must be admitted that the frank official's own company was and still is shipping gasoline from California to the Atlantic seaboard.

The Mid-Continent and California probably never will agree on the percentage of the total Atlantic seaboard sales each is entitled to record yearly. Certain of the former operators think that it is their field entirely, while the latter group think it is common ground.

### Mid-Continent Handicapped

The Mid-Continent is handicapped in its race with California to furnish gasoline to Eastern states, because of the location of oil field and refineries in the latter. The Los Angeles basin is producing the bulk of California oil, while refineries on navigable water are turning out most of the gasoline. This combination makes it possible to start gasoline from the Los Angeles harbor at a very low cost. Transportation of crude oil and gasoline by pipe line is a negligible expense, with the entire process taking place within a small radius.

The expense of shipping gasoline from California to the Upper Atlantic seaboard makes the margin of profit very small. Many California marketers feel that this greater expense should offset any "encroachment." Tanker rates are running above one dollar per barrel, as against about 40 cents from the Gulf Coast. Rates from California have not always been so high, but the unprecedented demand for ships during the past year has added to the expense of shipments.

The rapid shifting of the center of production has resulted in a change in the nature of California's shipments to the Atlantic seaboard. When South America started moving oil to the Atlantic seaboard, the western state was forced to make a quick shift and combat the competition with another weapon—gasoline. South America has been in the background but California marketers believe that it has affected Mid-Continent and Gulf Coast prices as much if not more than the shoving of California products through the Panama Canal.

Developments during the past two months indicate a smaller movement of California products through the Panama Canal to the Atlantic seaboard during 1930 than appeared at the beginning of the year. Determined efforts to reduce production should be reflected in lower refinery runs and less gasoline. This, in turn, would leave a smaller surplus to ship from the state. Regardless of curtailment in California, however, much gasoline will be shipped to fill the demand in Eastern states and to lower bulging stocks in the western state.

# California Halts Tank Building

## *Although Practically All*

# Storage Is Full

WITH California petroleum stocks standing at a new record of almost 186 million barrels, little room available and with major companies frowning on the building of additional storage, one of the greatest problems confronting the industry is the reduction of these large stocks to an economic level.

As the various stocks grew, the market structure became weaker. A better day seemed just around the corner, but overproduction continued and nearly every tank was filled on February 1. The surplus has become a burden, with total stocks standing out of line with immediate needs.

An analysis of present stocks reveals an excess in every commodity. Heavy crude, including all grades of fuel, stands above 112 million barrels. This compares with about 101 million barrels at the same time last year, 89 million barrels on April 1, 1926, the former peak, and 52 million barrels on January 1, 1924. Heavy crude stocks and fuel oil have been a source of worry for several years. As the demand became heavier for lighter products, heavy stocks increased. This gradual climb over a period of several years has been viewed with alarm for more than one reason. Despite the increased revenue from the lighter products, the economic structure of the market was affected by these burdensome heavy stocks. The cost of carrying heavy crude and fuel oil has been out of proportion to the amount received when these products actually were moved.

### Heavy Oil Stocks

The present record of stocks of heavy products was built up with many of the fields producing this oil partially shut in. Fuel oil, thrown over into this column through heavy refinery runs using light crude exclusively, has been a big factor, however. The old adage that a "barrel of oil is a barrel of oil" is true, when storage is considered. Heavy oil occupies the same amount of room as light oil, although purchasers have been able to place it in much less desirable places. The heavy oil problem is a serious one and the amount of new storage required during the next two years will depend largely upon the action of heavy stocks.

During recent years light crude stocks have been a good barometer of conditions. As they melted away the industry has shown a rallying tendency, with danger always in the offing when increases have been recorded month after month. At the end of 1928, light oil stocks had reached the remarkably low figure of 17,954,434 barrels. The increase during 1929 to 41,469,458 barrels was alarming in the extreme. On February 1, 1930, the total stood at better than 42 million barrels, which was just under the peak of 43,564,186 barrels, established on April 1, 1926. This rapid rise has placed the entire market structure in danger.

The unprecedented demand for light crude alone has been responsible for holding the total even to its present level. In some respects this demand has been artificial, having resulted in increasing refinery runs, which in turn brought about greater gasoline and fuel oil stocks. The economics of this conversion has been questioned, there being some reason to believe that if refinery runs had been held down to actual needs and total storage had been reflected in different totals, conditions would be better. The storing of light oil may be accomplished profitably in California, provided the demand is such that fresh stocks may be constantly replacing the older stocks.

A definite trend toward lower light oil stocks must be in evidence before storage conditions may be classed as satisfactory. A small decrease one month and a gain the next will not remove the danger now lurking within the state. The plan is to make definite inroads into light oil stocks, both to remove the necessity for building additional storage and to convert the present reserves into finished products. The cost of carrying oil in storage must eventually be charged to somebody. Either the consumer or the producer must pay the price. To remove the unnecessary burden, light oil stocks must be reduced.

### Excess Refinery Runs

The action of gasoline stocks during 1929, and particularly during January of this year, shows the result of excess refinery runs. At the beginning of 1929, stocks of this commodity totaled 10,766,410 barrels. The total at the end of the year was 16,434,842 barrels. The large increase during January, 1930, brought the total to a peak of 17,799,026 barrels, as compared with 11,116,928 barrels on April 1, 1926, when the former peak of total stocks was reached.

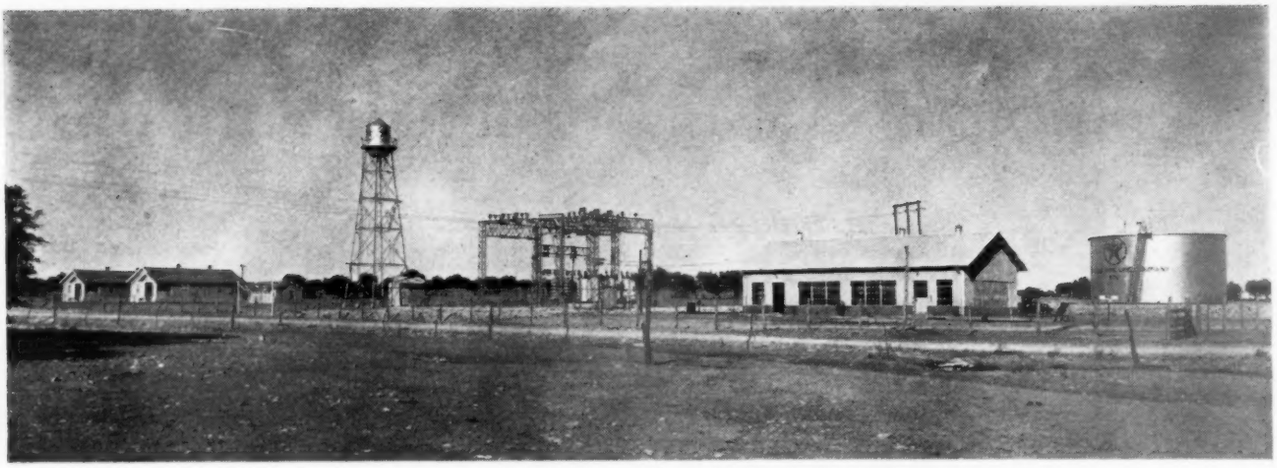
The California market structure is necessarily sensitive to excess gasoline stocks, and only the fact that they are held by companies which will not dump them on the market prevents trouble. Two California refiners are short on desirable room for additional stocks of gasoline, but they are particularly anxious not to start the erection of additional storage.

A reduction of gasoline stocks is greatly desired by leading refiners and if the plan to reduce refinery runs is inaugurated relief should be expected. The pres-

(Continued on page 238)

**COMPARATIVE TABLE OF PACIFIC COAST STOCKS**

| | Feb. 1,1930 | Feb. 1, 1929 | April 1, 1926 | April 1, 1924 |
|---|---|---|---|---|
| Heavy crude, under 20° A.P.I., and all grades fuel. | 112,654,215 | 100,925,122 | 89,237,660 | 52,393,302 |
| Refinable crude, 20° A.P.I., and above | 42,068,114 | 20,118,007 | 43,564,186 | 36,880,942 |
| Gasoline | 17,799,026 | 12,057,326 | 11,116,928 | 7,696,815 |
| Naphtha distillates | 3,281,669 | 1,644,474 | 6,339,453 | 13,114,490 |
| All other stocks | 10,124,457 | 9,921,944 | 10,161,739 | 6,641,893 |
| Total | 185,927,481 | 144,666,873 | 160,419,966 | 116,727,442 |



*General view of electric motor driven station at Sonora*

# Long Line Across Texas Most Modern in Construction

By JACK LOGAN
*Staff Representative*

FROM the scientific standpoint the new West Texas trunk line of The Texas Pipe Line Company, extending from Central Lea County, New Mexico, to Port Arthur, represents one of the most important projects of all pipe line history. For in it are embodied three noteworthy pioneering achievements. In the first place, it was the first of all pipe lines to be located through the use of aerial photography. In the second place, it was the first long trunk line having all pipe in the system electrically welded; and in the third place it demonstrated the practicability of mill-coated pipe.

Due to restriction of production through proration in practically all fields to which it connects, this pipe line is now handling only about one-half of its 55,000 barrel daily capacity.

The northwestern terminus of the line is in the west central part of Lea County, New Mexico, and oil starting from that point travels a total distance of 692 miles in reaching the other end of the line at The Texas Company's principal refinery at Port Arthur.

From the New Mexico terminus the line is of six-inch pipe to Jal, New Mexico. From there 10-inch pipe is used on a 77-mile stretch through the Hendrick field to Crane station, near the Church & Fields pool, Crane County. The 487-mile section from Crane station through the McCamey and Yates fields to Houston is made up of 12-inch pipe. From Houston to Port Arthur, a distance of 80 miles, a new 10-inch line was laid parallel with older lines.

### Factory Wrapped Pipe

Each joint of pipe used in the line was equipped with bell and spigot ends. Before leaving the various mills all the pipe was coated and wrapped. Four layer coatings of insulation were applied on all pipe by the Hill-Hubbel & Company with its patented equipment for application, installation products of The Texas Company being used, including a light coat of Texacoat Primer, followed by a heavy application of Texaco No. 35 hot asphalt, then tightly bound with Texaco saturated felt. The final protective measure consisted of a wrapper of spiral kraft paper. Incidentally, all pipe now used by The Texas Pipe Line Company is coated and wrapped at the mill. The only doping necessary in the field was to patch up breaks occurring in transit and at the welded joints. The pipe was buried to an average depth of 18 inches. For the 12-inch pipe, therefore, the required depth of the ditch was 30 inches.

In one case, along the route which was surveyed by aeroplane, it was necessary to haul pipe and equipment 90 miles from the nearest railroad point. Over half the right-of-way along the 260-mile section from San Marcos to Iraan had to be blast-

(Continued on page 246)

*Interior control room showing switchboards at Sonora station*

# *Protection of* Buried Pipe Lines Against Corrosion

By STANLEY GILL
*Research Department, Gulf Oil Companies*

PRACTICE in the protection of buried pipe lines against corrosion is undergoing rather rapid change. The changes are being brought about as a result of the concentrated effort which has been devoted to the study of this subject during recent years. Great strides in our knowledge of the performance of protective coatings for buried metal are being made as the result of this work and the increases in knowledge are being applied to improvements in protection practice. The work which is at present in progress is expected to develop, within the next few years, much fundamental information on the performance characteristics of pipe line coating materials and it is to be expected that radical changes will result. For this reason, any discussion of methods for protecting buried metal against corrosion can present only an "instantaneous" picture and must be read with a definite understanding that many of the statements made may become obsolete within a year of the time of writing.

### When Should Coating Be Used?

It is necessary to realize that the entire problem of the protection of buried pipe lines against corrosion has two phases which are, and must be, of equal importance in determining a decision as to the best methods to be used. These questions are:

1. Do economic considerations warrant the use of any method of protection and if so how great an expenditure is warranted and how effective must the protective method be in order to warrant that expenditure?
2. If corrosion prevention methods are justified in a given case, what method should be used?

The two questions are, of course, closely interrelated and the two must always be considered together. The first question, that which deals with the more strictly economic phases of protection practice, has been somewhat neglected and has not been studied as thoroughly as has the performance of protection methods. E. C. Kincade and Carl Weidner, in papers which they presented at the December, 1926, meeting of the American Petroleum Institute, touched upon this angle of the question. More recently, Chas. Fitzgerald[1] has presented a very excellent discussion of some of the economic factors entering into the protection of oil pipe lines. Mr. Fitzgerald has stated a view which is held by many engineers who have made a careful study of actual corrosive conditions on long pipe lines. Complete records of the corrosion experience on lines passing through average territory disclose the fact that ordinarily only a small percentage of the total length of a line is subject to serious corrosion. The corrosion records illustrated in Figure 1 are typical. These two lines have experienced much more serious corrosion than do most. Even in the very small scale charts, it is noticeable that this corrosion has been confined almost entirely to "hot spots" and that by far the greatest proportion of the mileage of the lines has not been seriously corroded. This is not an isolated case; such performance is typical of most pipe lines. The same point is illustrated by Figure 2, in which the frequency of corrosion leaks over a period of years is plotted against the age of the various pipe lines. It will be noted that there is very little difference in the frequency of corrosion leaks between the lines which are more than 10 years old. This curve may be interpreted as showing that practically all of the spots at which severe pitting action is experienced developed leaks during the first 10 years' life of the lines and that during the later life corrosion trouble consisted essentially of continued corrosion at these "hot spots." This statement is borne out by the detailed corrosion records of the lines upon which Figure 2 is based. A different condition is illustrated by Figure 3 which is a similar curve for a group of lines located on a 35-mile right-of-way in the Texas Coastal plain. Along this right-of-way, extremely severe corrosion trouble is experienced. A very large proportion of the total mileage is affected and the leak frequency continues to increase

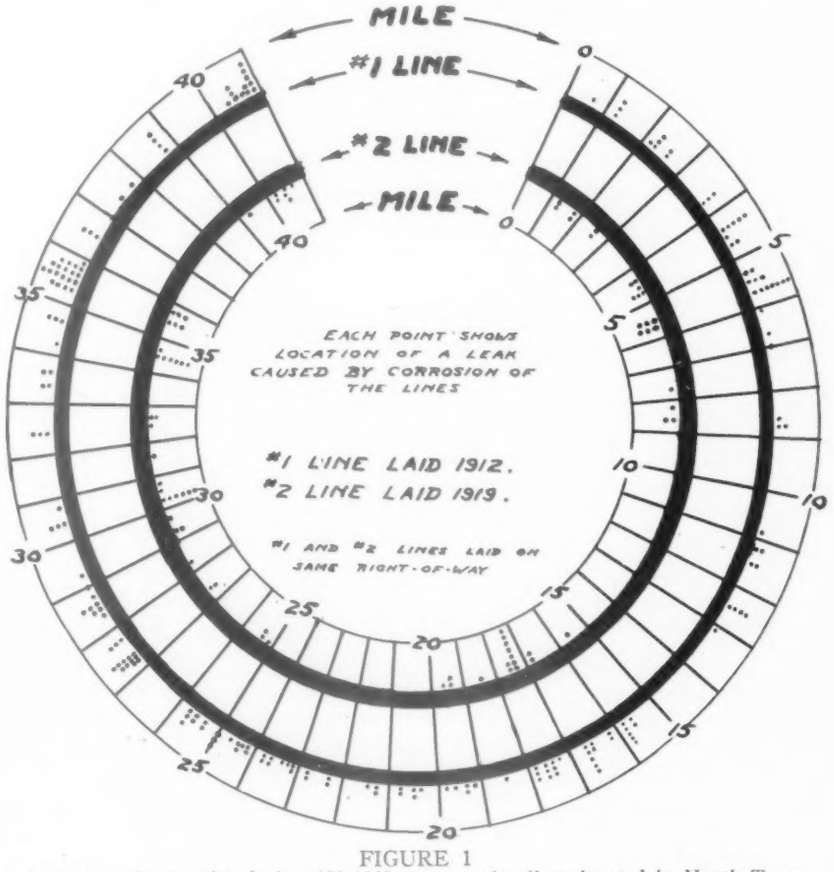



FIGURE 1
*Location of corrosion leaks* 1923-1929 *on two pipe lines located in North Texas*

[1] Chas. Fitzgerald; "Corrosion and Pipe Line Coverings" proceedings of the tenth annual American Petroleum Institute meeting, 1929, Part IV.

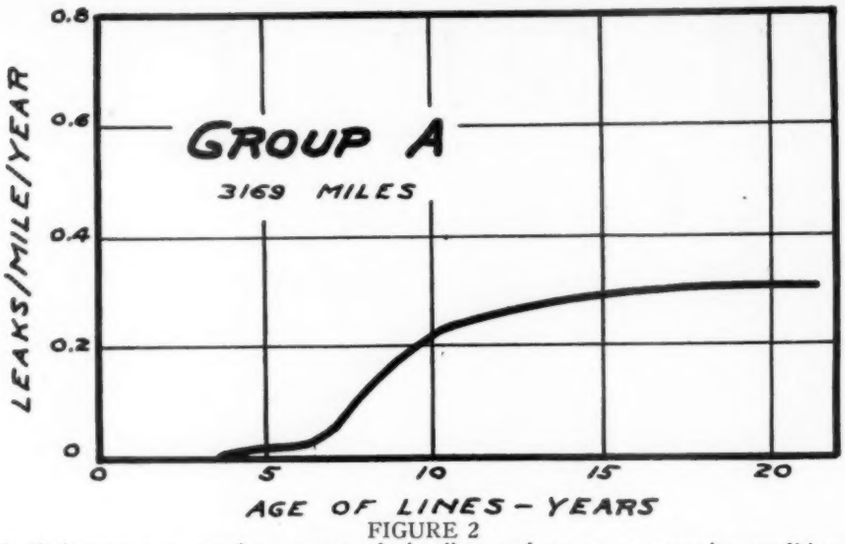



FIGURE 2

*Leak frequency curves for a group of pipe lines under average corrosion conditions*

rapidly as the line becomes older.

Under the rather typical condition which is illustrated by Figure 2 the economic advisability of coating pipe lines from end to end is open to question. It is obvious that, with a given expenditure, greater saving can be effected by a concentration of protection on the pipe in the "hot spots" than by coating, with a relatively ineffective protective coating, the total length of the line. Where new lines are laid parallel to old lines it is possible to locate the "hot spots" quite accurately. Where this cannot be done, there is no certain method of predetermining the location of sections on which severe corrosion will be experienced. Many attempts to correlate soil analysis with corrosion are being made. Up to the present time, these have not been successful. Even if they were successful, they would probably be prohibitively expensive as a means of accurate predetermination of corrosion of pipe lines, since it would be necessary to take samples at intervals of 50 or 100 feet in order to arrive at an accurate conclusion. In the absence of methods of predetermining corrosion, it is frequently economical to lay pipe lines bare, coating, with an effective protective material, only that pipe which is exposed to obviously dangerous conditions such as those existing in swamps, alkali flats, etc. As "hot spots" develop on the uncoated pipe, they can be taken care of. By this means, a highly effective corrosion prevention can frequently be accomplished at slight cost.

It is impossible to present in any condensed form a discussion of the factors which must be considered in determining the economic advisability of coating any given pipe line. It is important that this question should be always given consideration, since it is entirely possible to expend on protection of a pipe line sums greater than those which would be lost by corrosion if the line were laid with protection.

From a practical standpoint, any consideration of means for preventing the corrosion of buried pipe-lines must be limited to the use of protective coatings, particularly those of a bituminous nature. Much attention is being devoted to the use of special metals and metallic coatings for the purpose, and important developments along this line may be anticipated. It seems probable, however, that the applicability of special metals, and even of metallic coatings, will be very limited. This statement is based upon the fact that the only conclusion which can be drawn from comparisons of the resistance to soil corrosion of wrought ferrous materials in the price range containing steel, wrought iron, copper-bearing steel, ingot iron, etc., is that there is no marked or consistent difference between them as regards resistence to soil corrosion. It therefore seems probable that it will be necessary to use more expensive materials if soil corrosion is to be prevented by the use of special metal compositions. There are certain other methods of corrosion prevention which find some application in pipe line practice; however, their applicability is limited to a few special conditions. In general, then, it may be said that coatings afford the only economical means for combating the soil corrosion of buried pipe lines.

### Protective Coatings

The entire art of the design of protective coatings for buried pipe lines is in a state of rapid evolution and development. It is only within recent years that much concentrated technical and scientific effort has been devoted to this study, and the results of the work which is being done are only beginning to become apparent. Particularly important in their potentialities of future development are the excellent investigations being conducted by the Bureau of Standards, under the general direction of Kirk H. Logan, by Dr. Gordon N. Scott, under the auspices of the American Petroleum Institute, and by Dr. Scott Ewing in cooperation with the American Gas Association. Because of the great amount of work which is being done, the statements which follow present merely a summary of the present status of the art of pipe line coating practice, a practice which may be expected to undergo improvement in the near future.

Fundamentally the effectiveness of a protective coating is dependent upon its ability to exclude from contact with the protected surface any and all corrosive agents. This does not mean that a coating which is somewhat pervious is necessarily ineffective. However, it is certain that a coating which positively excludes corrosive agents will afford positive protection against corrosion. It seems logical, therefore, to accept impermeability to corrosive agents as a basic necessity for any protective coating. Exception to this may

(Continued on page 201)

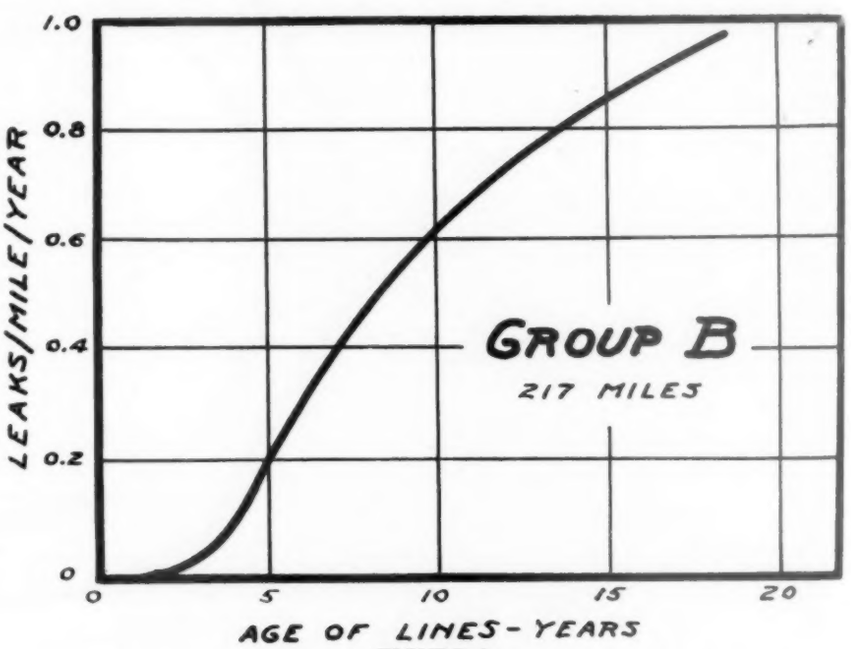



FIGURE 3

*Leak frequency curves for a group of lines exposed to extremely severe corrosive conditions*

# The Year in Traffic and Transportation

## *A non-technical observation from the sidelines*

A CASUAL study of the major events transpiring in the traffic and transportation fields of the oil industry during the past year, presents an interesting picture, perhaps without parallel in the history of the industry. For many years, the industry in its various branches of producing, refining and marketing, has rocked along secure in the even tenor of its way under practices, rates, rules, regulations and modes of transportation which had come to be recognized and acceptable as the ultimate in progress and economy as well as service. Yet, it does not require the wisdom of a sage or the clairvoyance of a seer to recognize in the happenings of the past year along the lines mentioned, an inevitable change forecasted for the future in several directions, some of which may be radical in character and reach to the very core of present methods of transportation and distribution. In a few words the future holds an almost certain revamping, reworking and realigning of rates for transportation both rail and pipe line; changes in points of distribution which will necessarily follow changes in rates; changes in modes of transportation by pipe line such as the transportation of refined products on a vast scale, as might reasonably be presumed from the recent conversion of the line of the Tuscarora Pipe Line Company in the East from crude oil to the transportation of gasoline and the periodical persistent rumors of the construction by the Barnsdall interests of a line from the Mid-Continent refining districts to advantageous points of distribution in the north and central sections of the country, where refined products so transported will be marketed, stored or distributed. These and other factors of a minor nature are generally regarded as not only feasible and economic, but as scheduled, certain events, existing in the future for the industry, the only question as yet undetermined being, when the changes will take effect and to what extent the industry will be affected.

### New Construction and Extensions

Outstanding in construction activities among the rail lines, was the completion of the line of the Texas-New Mexico Railroad into Cheyenne, Texas, Winkler County, the line having already been in operation as far as Wink and Kermit. The additional construction was undertaken after appropriate permission from the Interstate Commerce Commission and the Railroad Commission of Texas, to serve the new and increased production of the Winkler pool. Control of the road was later acquired by the Texas and Pacific Railroad and is now being operated by that road, a further extension having been under consideration for some time into the southeastern section of New Mexico. What was regarded as another favorable possibility for some time, was the proposed construction of a rail line from San Angelo to Yates to be known as the Yates and West Texas Railroad for the purpose of serving the in and outbound requirements, primarily, of the prolific Yates field and incidentally the section along the route of the line, was dissipated by the refusal of the Interstate Commerce Commission to recognize in the proposal the necessary elements of public convenience and necessity. Accordingly the petition of the parties proposing construction of the line was denied and the project, for the time being at least, has been abandoned. There is very little doubt that with the continued growth and development of that particular section of the state which is certain to follow on the heels of continuous drilling and production, the necessity for rail transportation will in due time be such as to result in construction of the proposed line.

Aside from these two major events, there have been any number of smaller extensions and proposed new construction which have been either completed or abandoned. The Santa Fe was granted authority to make some extensions of its lines so as to more completely serve some of the oil producing sections, but have abandoned one of them at least due to the decline in production and the possibility that by the time construction was completed the necessity and economy of such service might be problematical.

Trunk line construction among the pipe line carriers during the year has been of a negligible quantity with the possible exception of the line recently completed by the Gulf Coast Pipe Line from Refugio to Port Aransas on the Texas Coast. This line was projected to afford an outlet for the production of the Refugio field, but the recent rapidly mounting daily production as a result of the completion of new wells, indicates that a large part of the production must necessarily find its way to market through the medium of tank car shipment, until and when, additional trunk line facilities for transportation have been established. In the field of prospect, there are a number of interesting proposals, the principal of which, at the present time, appears to be the line from East Texas to the coast terminals of Pure Oil Company, the latter company according to reports, to be builder and owner of the line and expects to have it completed and in operation in a short time. There has been, along with the unprecedented development, an abnormal amount of construction work carried on in connection with the gathering systems of the several pipe line companies and in addition, new stations for the receipt and transportation of crude have been established in some cases, and designated in others, with appropriate rate schedules applying therefrom to the various points of delivery such as refining points and coastal terminals.

### Changes in Transportation Rates

As affecting rail transportation in the matter of rate changes, the past year has been one of normal complexion. No changes of a radical or important character have been recorded, but as stated in the beginning, the future looms fertile and productive in these respects. The usual number of new rates and rate bases are to be found in the year's docket. Special crude oil rates which were established to aid the movement in tank cars and to meet pipe line competition, which were scheduled to expire on December 31, 1929, were extended for another six months until June 30, 1930; special rates and bases for rates were authorized and established from newly established refining points and from already established points to meet the competition of other points and that resulting from the establishment of the new ones and the newly established terminals of Humble Oil & Refining Company at Ingleside, Texas, on the Southern Pacific Lines have been placed on a general parity with the ports in the Houston group under the same rates as a general proposition.

The situation as affecting the transportation of materials and supplies has been favored with a reduction in at least two instances which are of no mean importance, as follows: rates on pipe line coating were established in the Southwest on the so-called Column 27½ basis of the Consolidated Southwestern Scale and the Column 32½ basis of the same scale, which had previously applied on sucker rods between other points in the Southwest and on interstate traffic to Texas points, was also established for application to traffic between points in Texas of a strictly intrastate character.

Among the pipe line carriers, very few changes have been noted during the year and what changes have resulted are for the most part in the nature of reductions or establishment of rates from newly constructed receiving points or stations which

are generally to be found on the district rate basis.

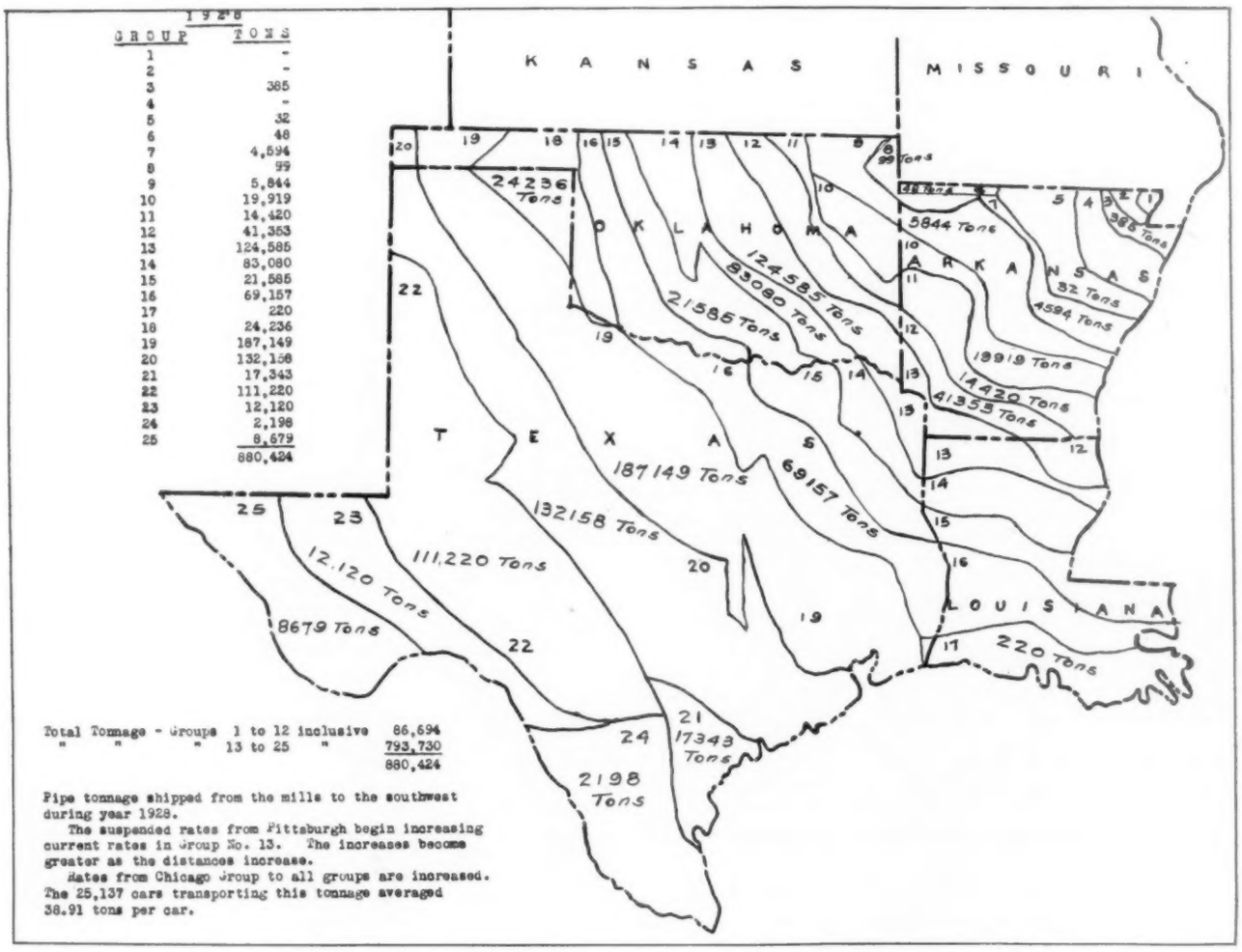
### Proposed Changes in Rates

As far as the pipe line carriers are concerned, there appears no sound reason to anticipate any change for the near future in the present fabric of rates for transportation, although there have been some very healthy rumors afloat to the effect that an attack would be made upon the present rates on the grounds of being extortionate and unreasonable. This, however, is a question that goes much deeper than the mere matter of transportation and what would be a reasonable charge therefor, considering that there is present in connection with this form of transportation many items and factors of a nature that do not exist in rail transportation and which, if not given their due consideration, might result in disaster to either side of such an issue, so that it is expected, if any activities of this character are inaugurated, the utmost caution will be found as a keynote in the proceedings.

Of immediate interest to the oil industry as a whole on the one hand and the great body of the consuming public on the other, is that vast proceeding now before the Interstate Commission known as Docket 17000, Parts 4 and 4A, in which is involved the rates on petroleum products by rail, from points in the Southwest to points in the Central, Eastern, Southern and Mississippi Valley sections of the country and between points in the Southwestern states. This proceeding was instituted by the Interstate Commerce Commission on its own motion, acting under the duties imposed by the Hoch Smith Resolution and as a result of numerous complaints filed by shippers and receivers with that body, as to the rates in the particular sections noted above. In cooperation with the several railroad commissions, shippers, receivers, consumers and the rail lines, the commission held hearings in various cities throughout the affected sections and a great mass of evidence and testimony was submitted by all interested parties, with the result that the commission now has before it, perhaps the most comprehensive and elaborate picture of the needs and requirements of all concerned, in the transportation and the charges therefor, of any one commodity that has ever been presented and likewise such as will affect the transportation of the greatest volume of traffic of any one manufacturing industry. Thus far, the proceedings have reached the stage where the examiners have submitted a proposed report of their findings, and the report while not unexpected, if adopted by the commission, will be far-reaching and result in a revolutionary change in the present rate fabric everywhere through the affected sections. Heretofore and at the present time, the general plan of rates, for traffic from state to state and from points of production to particular sections of the country such as those above referred to, has been what is known as a group system, that is, the points of origin on the one hand and the destinations on the other have been grouped and rates fixed for each group, based upon the average distance from the group as the leading consideration, with due regard to the elements of competition and volume of traffic as incidental influences and matters of an economic nature. Now the examiners have set down two scales of rates upon which the new structure of rates should be based provided the scales are finally prescribed by the commission in its final report.

While the matter of grouping is permitted to some extent, it has been largely discouraged and especially on traffic between points in the Southwestern states, will the new structure become practically a distance scale, with perhaps small groups on both ends. It is not practical in this limited space to go into detail as to the varied proposals of the examiners as to the methods of rate construction proposed from and to the various sections, but a slight discussion of the two scales may be illuminating. Scale "A" proposed for application between points in the Southwest as far down as strip of territory in Northwest, West and Southwest Texas runs from one mile to 1000 miles and begins at 10 cents, increasing one cent per

(Continued on page 244)



# Texas-Empire Line Capacity Increased by Nine New Stations

HOUSTON.—Capacity of the trunk line of Texas-Empire Pipe Line Company, from Lima, Oklahoma, to the Chicago refining territory, will be increased approximately 50 per cent within the next six months through construction of nine additional pump stations.

The line has been in operation since October 1, 1929, and is now operating practically at capacity, delivering 50,000 barrels of crude daily to Lawrenceville, Story, Lockport and Lamont, Illinois, and to East Chicago, Indiana.

Following completion of the nine new pump stations, the system will be able to handle approximately 74,000 barrels daily. All of the new stations are expected to be in operation by September 1, 1930. There will then be a total of 20 booster stations on the line.

Oil engine stations predominate among the present 11 stations on the line, there being only three that are motor driven.

The eight oil engine stations are located at Cushing and Alluwe, Oklahoma; Lowry City, Pisgah and Center, Missouri; and Virginia, Heyworth and Wilmington, Illinois.

The Cushing and Alluwe stations are each equipped with three Prescott duplex pumps and three Worthington engines. Stations at Lowry City, Pisgah, Center and Virginia are each equipped with three Wilson-Snyder duplex pumps and three McIntosh-Seymour engines. At the Heyworth station there are four Worthington duplex pumps and four McIntosh-Seymour engines. The Wilmington station has three Worthington duplex pumps and three McIntosh-Seymour engines.

### Electric Stations

The three electric stations are as follows: Lima, Oklahoma, in the Seminole area, equipped with four Worthington duplex pumps, five General Electric motors, and one National Transit pump; Clemantis, near Davenport, Oklahoma, equipped with two Prescott duplex pumps and two General Electric motors; and Scammon, Kansas, where there are three Prescott duplex pumps and three Westinghouse induction motors.

Although plans are now going forward on construction of the nine new stations, actual work has not yet been started, and details of the construction program have not been given out.

At the northern end of the line, the Texas-Empire Pipe Line Company system branches out in several directions. The extremity of the longest of those branches is 730 miles from Lima, Oklahoma.

Following is a summation of all pipe in the system.

From Lima, Oklahoma, to Cushing, 10-inch pipe, 57.41 miles.

From Cushing, Oklahoma, to Wilmington, Illinois, 12-inch pipe, 620 miles.

Wilmington to East Chicago, 12-inch pipe, 53 miles.

Wilmington to Manhattan Junction 12-inch pipe, 11 miles, and thence to Lockport, Illinois, two six-inch lines, 16½ miles.

Branch line leading out of the main line, Heyworth, Illinois, to Lawrenceville, Illinois, to refinery of Indian Refining Company, eight-inch pipe, 131 miles.

At Lockport, Illinois, crude is supplied to the refinery of The Texas Company, and at East Chicago to the plant of Empire Oil & Refining Company.

All of the 12-inch pipe in the trunk line of the Texas-Empire Pipe Line Company, comprising a large percentage of all pipe used, was electrically welded, and all of the pipe was coated and wrapped at the mills.

*Exceptionally large manifold that is made relatively simple through signs over all lines. This is at the Sour Lake, Texas, station on the main line of the Texas Pipe Line Company. Large quantities of crude pass that point daily. It is not far above The Texas Company's refining and shipping center at Port Arthur.*

# New Wrinkles in Welded Line for River Crossing

By R. W. BOGGS
*Linde Air Products Company*

RIVER crossings form an important phase of pipe line construction and pipe line engineers are constantly in search of suggestions as to improved methods for handling these crossings. The recent installation of an eight-inch high pressure gas line crossing the Hudson River between Beacon and Newburgh involves several new features of design and construction procedure that should be of interest to all pipe line engineers.

This line was laid by Central Hudson Gas and Electric Corporation, of Poughkeepsie, New York, the contractor for the river crossing being L. E. Myers Construction Company, Inc., of New York. It crosses at a point where the river is 6300 feet wide, the depth of the water varying from 20 to 50 feet. The tide runs either way at a maximum rate of five miles per hour and the wind causes quite rough water at times. River traffic is also rather heavy. Extra heavy eight-inch pipe was used for the portion of the line crossing the river, which was designed for an ultimate pressure of 100 pounds per square inch and is at present operating at 45 pounds per square inch.

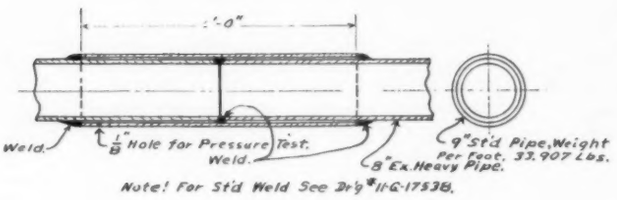
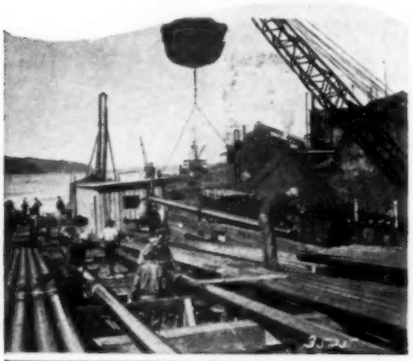



FIGURE 1

The river crossing was entirely welded by the oxy-acetylene process and a novel type of joint was designed and used. The pipe was joined with the standard butt weld, reinforced with a sleeve consisting of a three-foot length of nine-inch standard pipe placed over each joint and welded to the pipe at each end with fillet welds, as shown in Figure 1. The advantages of this type of joint are three: First, it stiffens the joint against bending stresses during laying; second, it provides an additional factor of safety inasmuch as two welds must prove defective before leakage can occur; third, it permits each joint to be tested very easily upon completion.

### Testing Procedure

The procedure for testing was as follows: Each sleeve was furnished with a hole threaded for a one-eighth-inch pipe nipple. By means of this hole a cylinder of compressed nitrogen was connected to the five-thirty-seconds-inch annular space between pipe and sleeve through one-eighth-inch pipe, fitted with a pressure gauge and valve. The pressure was brought up to 350 pounds per square inch and soapy water was painted around the sleeve welds. Figure 2 shows one of the joints undergoing test. If the pressure dropped and no leak in the sleeve weld could be detected, the center butt weld would, obviously, be defective and the pipe would have to be cut and re-welded. This did not happen, however, once during the entire operation. Only nine cylinders of nitrogen were used in testing the 163 joints in the river crossing, the volume of each space between pipe and sleeve being only one-tenth cubic foot. The saving of time and effort effected by this method of testing as compared with usual methods is quite apparent. As a word of caution, oxygen should never, under any circumstances, be used for pressure testing because oxygen under pressure will react with explosive violence in contact with oil or grease. Compressed air would normally be used for such testing, but a compressor capable of giving the high pressure required was not available at the time.



*Left, Figure 3—Loading pipe on barge. Right, Figure 4—Doubling operation.*

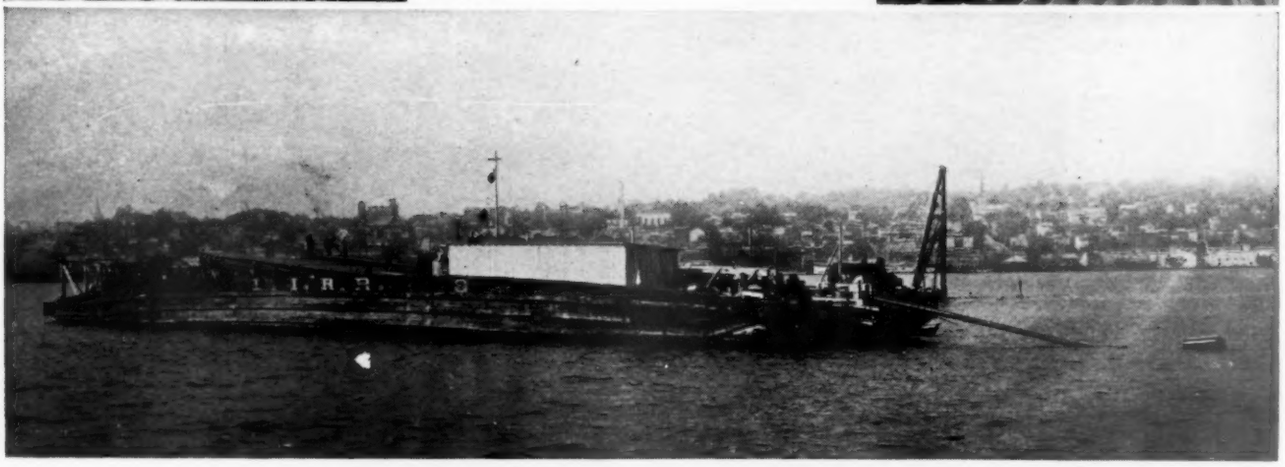


*Figure 5—Barge during progress of the crossing*

FIGURE 6—*Rope-lined rollers along center of barge*

FIGURE 8—*Making the butt weld; note sleeve on pipe*

The nature of the curve that the pipe would follow when laid out from the barge to the river bottom and the probable stresses that would be developed were well worked out by application of the elastic theory and the formulas deduced were checked by experiments with one-half-inch gas pipe. One device for reducing the laying stresses was the use of pontoons to decrease the effective weight of the pipe to about one-half pound per foot, as will be described later.

### Equipment of Barge

The river on both sides was dredged to a maximum of 20 feet below high water before the crossing was started. Meanwhile a railroad car ferry barge 280 feet long had been obtained and an inclined rack, sloping from the bow to the stern of the barge, was built on the deck out of timbers. Sufficient 40-foot lengths of pipe for the entire crossing were loaded on the barge by means of a steam crane, as shown in Figure 3. The pipe was then double-lengthed by welding two 40-foot pieces together, using the type of joint described above. Figure 4 shows a general view of the double-lengthing operation. After joints had been tested and the pipe given its specified protective coating, the 80-foot lengths were stacked on both sides of the rack toward the bow of the barge. Along the center of the barge from bow to stern was erected a series of rollers to carry the pipe as it was welded, tested and laid out. The last roller at the stern was set as close to the deck as possible, the rest increasing in height to a maximum of eight feet at the bow to allow a smooth curve in the pipe, which ended in a 200-foot straight horibontal run at the bow. An idea of the curve assumed by the pipe may be gained from Figure 5. The rollers were covered with rope to prevent damage to the pipe coating. This arrangement is shown in Figure 6. A five-ton truck equipped with a 12-ton winch was taken on board to move the pipe. An acetylene generator, a supply of carbide, a sufficient supply of oxygen cylinders and welding rods were loaded on the barge. Cylinders of dissolved acetylene were also supplied for use while recharging the generator and also as an emergency measure. Cylinders of compressed nitrogen for testing purposes were also taken on board. A generator driven by a gasoline motor for electric lights, necessary to permit continuous operation through the night, a cook house, bunk house and bedding completed the equipment of the barge.

Welders were required to pass tests before being allowed to work on the double-lengthing or river crossing. At all times the work of the welders was under the close observation of a competent inspector.

Once started, the laying proceeded on a 24-hour schedule. The barge was of sufficient length so that three of the 80-foot sections could be lined up along the center of the barge, affording three operating positions. In the position nearest the bow of the barge the double lengths were aligned and tack welded and the butt weld was made, Figures 7 and 8; in the second position the sleeve was welded, Figure 9; and in the third position the joint was tested, as shown in Fegure 2.

(Continued on page 262)

(In circle)
FIGURE 2—*Testing joint*

FIGURE 7—*Aligning and tack-welding pipe, using clamp*

FIGURE 9—*Making sleeve weld to complete the job*

# North Texas Storage Capacity Exceeds 30,000,000 Barrels

WICHITA FALLS, Texas.—Steel storage facilities in North and Central West Texas amounts to 30,424,500 barrels gross capacity, and the bulk of these tanks have been in service for an average of 10 years. These figures do not include the combined capacity of the many thousand small flow tanks scattered over the various producing leases.

The 55,000-barrel tank predominates as the most popular crude retainer in view of the fact that producers and purchasing companies were not sold on the merit of the 80,000-barrel tank when the major tank farms were being established in the above light oil districts.

Tank farms operated in conjunction with main line stations of trunk lines and also refineries are included in the accompanying list of tanks by counties, thus materially swelling the total capacity. However, the major pipe line companies, with some exceptions, have discontinued the practice of erecting tank farms at intermediate stations, and now prefer to keep the oil moving from source of supply to refineries, export terminals and principal concentration points. Such a policy has been noticeable in connection with the installation of major pipe line systems in Texas within the past few years.

Large tank farms located at refineries in the North and Central West Texas districts were built primarily for crude storage, but such tanks are now used to an advantage during dull market periods for the accumulation of fuel oil and the general run of refined products. Tanks used for storing gasoline and other light ends are invariably equipped with modern devices to arrest evaporation losses.

Eastland County is credited with having the largest crude storage facilities in the district, having nearly 10,000,000 barrels of gross capacity from 182 tanks. All of these tanks are 55,000 barrels in capacity, with the exception of two smaller ones used as working tanks for the pipe line stations. The flush production offered on short notice by the Ranger and Desdemona fields found the pipe lines and railroads lacking, and forced the erection of big tank farms. This tankage was later used to an advantage when Stephens County's series of fields centering on and around Breckenridge came through with big production.

Tankage in Eastland and nearby counties has been utilized to a large extent by Humble Oil & Refining Company, Gulf Production Company and Magnolia Petroleum Company in recent years for a stopping off point on sulphur oils brought in by eight- and 10-inch trunk lines from the Panhandle and West Texas districts.

**TANKAGE IN NORTH AND CENTRAL WEST TEXAS**

| Counties | No. Tanks | Gross Cap. in Barrels |
|---|---|---|
| Archer | 9 | 410,000 |
| Brown | 3 | 30,000 |
| Clay | 9 | 477,500 |
| Coleman | 4 | 220,000 |
| Comanche | 58 | 3,090,000 |
| Cooke | 1 | 20,000 |
| Dallas | 47 | 3,050,000 |
| Eastland | 182 | 9,665,000 |
| Hall | 1 | 55,000 |
| Hunt County | 1 | 37,500 |
| Knox | 3 | 165,000 |
| Montague | 19 | 1,045,000 |
| Palo Pinto | 6 | 290,000 |
| Parker | 1 | 55,000 |
| Shackelford | 1 | 37,500 |
| Stephens | 12 | 590,000 |
| Tarrant | 74 | 3,955,000 |
| Wichita | 114 | *5,992,000 |
| Wilbarger | 15 | 875,000 |
| Wise | 5 | 275,000 |
| Young | 2 | 90,000 |
| Total | 567 | 30,424,500 |

*Includes tanks in Oklahoma side Burburnett field.

Wichita County ranks second in actual storage facilities in North and Central West Texas, having 5,992,000 barrels of gross capacity, including a large tank farm held by the Sinclair Pipe Line Company on the Oklahoma side of the Burkburnett field. This latter tank farm has always been associated directly with Texas' fields, as it was built solely for the accumulation of oil run from Wichita and nearby counties. Numerous independent refineries in Wichita County have helped swell the total storage facilities through the erection of tanks to serve the dual purpose of storing crude oil during low price periods and for holding burning oils for cracking stills or better market conditions.

Continental Oil Company and Waggoner Refining Company are introducing the first group of steel tanks in North Texas that exceed the 55,000-barrel capacity, and both have placed orders for 80's. The former is breaking ground for the immediate construction of six 80's to be located adjacent to its refinery at Wichita Falls. Waggoner Refining Company is starting work on two new 80's to be erected on its Wilbarger County tank farm and refinery site, located west of Electra. Two 55's are in service at this refinery site, and the Waggoner Refining Company has two 55's located on its Waggoner H lease in the South Vernon district. The latter were built in August, 1928.

In connection with its big tank farm at Gates, near Dallas, The Texas Company his six of the largest steel tanks in the upper part of the state. This company purchased six 120,000-barrel steel tanks in September, 1928, and the construction work was performed by the mill furnishing the steel plates. These unusually large tanks are available for the company's refinery at Gates, as well as for The Texas Pipe Line Company. They have a diameter of 144 feet, and a height of 40½ feet.

## North and Central West Texas Steel Tankage

**ARCHER COUNTY**

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| Continental Oil Company | 1 | 55,000 | 55,000 |
| Freeman et al | 1 | 37,500 | 37,500 |
| Gulf Production Company | 1 | 55,000 | 55,000 |
| Humble Oil & Refining Company | 2 | 30,000 | 60,000 |
| Magnolia Petroleum Company | 2 | 55,000 | 110,000 |
| Pure Oil Pipe-Line Company | 1 | 55,000 | 55,000 |
| J. I. Staley | 1 | 37,500 | 37,500 |

**BROWN COUNTY**

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| Humble Oil & Refining Company | 3 | 30,000 | 90,000 |

**CLAY COUNTY**

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| The Texas Company | 8 | 55,000 | 440,000 |
| The Texas Company | 1 | 37,500 | 37,500 |

**COLEMAN COUNTY**

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| Atlantic Oil Producing Company | 3 | 55,000 | 165,000 |
| Gladys Belle Company | 1 | 55,000 | 55,000 |

**COMANCHE COUNTY**

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| Humble Oil & Refining Company | 40 | 55,000 | 2,200,000 |
| Magnolia Petroleum Company | 9 | 55,000 | 495,000 |
| United Producers Pipe-Line Company | 1 | 55,000 | 55,000 |
| Prairie Oil & Gas Company | 3 | 55,000 | 165,000 |
| Prairie Oil & Gas Company | 5 | 35,000 | 175,000 |

(Continued on page 242)

# West Texas Has 19,500,000 Barrels Empty Storage

SAN ANGELO, Texas.—West Texas offers storage facilities that ranks among the leading crude concentration points in the Southwest, having approximately 800 large steel and concrete tanks that afford a combined gross capacity of 56,705,000 barrels. These figures are exclusive of the many thousand small tanks scattered over the various oil producing leases in the district. Crude stocks in these tanks at the close of January were estimated at 37,200,000 barrels, leaving approximately 19,500,000 barrels of idle storage.

The balancing of production with pipe line, tank car and local refinery demand during the latter part of 1929 has greatly curtailed tank building. Indications are that a large percentage of the tankage now classed as idle will not be in service until new fields are discovered. This idle tankage is scattered over a wide area, and can not be utilized unless its location and transportation facilities are favorable for handling oil from new flush areas.

Winkler County leads in storage facilities as result of the big daily crude yield developed in the Hendrick field prior to the arrival of pipe lines. This county has 13,034,000 barrels of storage capacity. Midland County ranks second with 11,350,000 barrels of storage, although the county is without oil or gas production. It was selected by the Atlantic Pipe Line Company, Gulf Pipe Line Company and Magnolia Pipe Line Company as their principal crude concentration point, and these three companies erected 150 large tanks on adjoining tank farms located east of the town of Midland. Magnolia Pipe Line Company has 81 80's and 17 55's on its farm, and all tanks are equipped with gas tight roofs. Atlantic Pipe Line Company has 37 80's and five 55's on its Midland farm, which is the most attractive in appearance in the district, with each tank covered with aluminum paint. Gulf Pipe Line Company has six 80's and four 55's on this tank farm.

Combined storage facilities of the Magnolia Petroleum Company and Magnolia Pipe Line Company offers a gross capacity of 10,430,000 barrels in the district, while Shell Petroleum Corporation and Shell Pipe Line Company ranks second in storage facilities with a combined total of 5,345,000 barrels, including one million barrel capacity concrete reservoirs in Ward and Upton Counties. Gulf Production Company has a total storage capacity of 5,100,000 barrels, while Humble Oil & Refining Company has only 4,570,000 barrels.

Cosden Oil Company is erecting two 80's on its producing property in the Judkins field, Ector County, and also adding one tank of similar capacity to its refinery tank farm near Big Spring. Cranfill-Reynolds Company was asking for bids late last week for removal of two or more tanks from Winkler County to be set up on the company's producing property in Fisher County. These tanks are needed to store oil production being prorated by the Humble Oil & Refining Company. Pasotex Petroleum Company is erecting two 82,000 barrel (API) tanks at its El-Paso refinery tank farm, and also a number of smaller tanks.

### TANKAGE IN WEST TEXAS COUNTIES

| Counties | No. Tanks | Gross Capacity in Bbls. |
|---|---|---|
| Crane | 135 | 7,862,000 |
| Crockett | 1 | 55,000 |
| Ector | 2 | 80,000 |
| El Paso | 13 | 754,000 |
| Howard | 41 | 2,973,000 |
| Jones | 1 | 55,000 |
| Midland | 150 | 11,350,000 |
| Mitchell | 14 | 730,000 |
| Pecos | 19 | 1,183,000 |
| Reagan | 53 | 3,470,000 |
| Reeves | 3 | 165,000 |
| Upton | 88 | 6,769,000 |
| Val Verde | 25 | 2,000,000 |
| Ward | 71 | 6,225,000 |
| Winkler | 177 | 13,034,000 |
| Totals | 793 | 56,705,000 |

## West Texas Storage Facilities

### WEST TEXAS TANKAGE

#### CRANE COUNTY

| | No. Tanks | Size Tanks in bbls. | Total Capacity in bbls. |
|---|---|---|---|
| Atlantic Oil Producing Co. | 2 | 74,000 | 148,000 |
| Atlantic Oil Producing Co. | 12 | 55,000 | 660,000 |
| Gulf Pipe Line Company | 2 | 80,000 | 160,000 |
| Humble Oil & Refining Company | 6 | 55,000 | 330,000 |
| Independent O&G Company | 2 | 55,000 | 110,000 |
| Magnolia Pipe Line Company | 4 | 55,000 | 220,000 |
| Prairie Oil & Gas Company | 3 | 55,000 | 165,000 |
| Simms Oil Co. | 22 | 55,000 | 1,210,000 |
| The Texas Co. | 12 | 80,000 | 960,000 |
| The Texas Co. | 31 | 55,000 | 1,705,000 |
| The Texas P. L. Company | 1 | 37,500 | 37,500 |
| Tidal Refining Co. | 1 | 55,000 | 55,000 |
| Warner-Quinlan Company | 28 | 55,000 | 1,540,000 |
| Warner-Quinlan Company | 3 | 80,000 | 240,000 |
| Warner-Quinlan Company | 1 | 64,000 | 64,000 |
| Warner-Quinlan Company | 1 | 37,500 | 37,500 |

#### CROCKETT COUNTY

| | | | |
|---|---|---|---|
| Humble Oil & Refining Company. | 1 | 55,000 | 55,000 |

#### ECTOR COUNTY

| | | | |
|---|---|---|---|
| Cosden Oil Co. | 2 | 80,000 | [1]160,000 |

#### EL PASO COUNTY

| | | | |
|---|---|---|---|
| Pasotex Pet. Co. | 6 | 55,000 | 330,000 |
| Pasotex Pet. Co. | 2 | 82,000 | [1]164,000 |
| Pasotex Pet. Co. | 1 | 40,000 | [1]40,000 |
| Rio Grande Oil Co. | 4 | 55,000 | 220,000 |

#### HOWARD COUNTY

| | | | |
|---|---|---|---|
| Cosden Oil Co. | 6 | 80,000 | [1]480,000 |
| Cosden Oil Co. | 4 | 55,000 | 220,000 |
| Humble Pipe Line Company | 2 | 64,000 | 128,000 |
| Magnolia Pet. Co. | 10 | 80,000 | 800,000 |
| Magnolia Pet. Co. | 7 | 55,000 | 385,000 |
| Texas Pacific Railway (Fuel) | 12 | 80,000 | 960,000 |

#### JONES COUNTY

| | | | |
|---|---|---|---|
| Phillips Pet. Co. | 1 | 55,000 | 55,000 |

#### MIDLAND COUNTY

| | | | |
|---|---|---|---|
| Atlantic Oil Producing Co. | 37 | 80,000 | 2,960,000 |
| Atlantic Oil Producing Co. | 5 | 55,000 | 275,000 |
| Gulf Production Company | 6 | 80,000 | 480,000 |
| Gulf Production Company | 4 | 55,000 | 220,000 |
| Magnolia Petroleum Company | 81 | 80,000 | 6,480,000 |
| Magnolia Petroleum Company | 17 | 55,000 | 935,000 |

#### MITCHELL COUNTY

| | | | |
|---|---|---|---|
| Coltex Refining Company | 6 | 55,000 | 330,000 |

[1]Building—

| | | | |
|---|---|---|---|
| Coltex Refining Company | 2 | 35,000 | 70,000 |
| Magnolia Petroleum Company | 6 | 55,000 | 330,000 |
| **PECOS COUNTY** | | | |
| The California Company | 1 | 55,000 | 55,000 |
| Humble Pipe Line Company | 2 | 64,000 | 128,000 |
| Humble Oil & Refining Company | 1 | 55,000 | 55,000 |
| Illinois Pipe Line Company | 4 | 55,000 | 220,000 |
| Shell Petroleum Corporation | 6 | 80,000 | 480,000 |
| Simms Oil Company | 3 | 55,000 | 165,000 |
| The Texas Pipe Line Company | 2 | 40,000 | 80,000 |
| **REAGAN COUNTY** | | | |
| Big Lake Oil Company | 12 | 55,000 | 660,000 |
| Group 1 Oil Corp. (Conoco) | 9 | 55,000 | 495,000 |
| Humble Pipe Line Company | 10 | 66,000 | 660,000 |
| Humble Pipe Line Company | 5 | 64,000 | 320,000 |
| Humble Pipe Line Company | 2 | 67,500 | 135,000 |
| Reagan Company Purchasing Co. | 15 | 80,000 | 1,200,000 |
| **REEVES COUNTY** | | | |
| Burford Oil Company | 3 | 55,000 | 165,000 |
| **UPTON COUNTY** | | | |
| Gulf Pipe Line Company | 2 | 80,000 | 160,000 |
| Humble Oil & Refining Company | 21[1] | 55,000 | 1,155,000 |
| Humble Oil & Refining Company | 6 | 80,000 | 480,000 |
| Mid-Kansas Oil & Gas Company | 2 | 55,000 | 110,000 |
| Landreth Production Corporation | 10 | 80,000 | 800,000 |
| Prairie Oil & Gas Company | 21 | 55,000 | 1,155,000 |
| Shell Petroleum Corporation | [2]1 | | 1,000,000 |
| Shell Petroleum Corporation | 20 | 80,000 | 1,600,000 |
| Southern Pipe Line Company | 2 | 55,000 | 110,000 |
| Texas Pipe Line Company | 1 | 64,000 | 64,000 |
| T. P. Coal & Oil Company | 1 | 80,000 | 80,000 |
| T. P. Coal & Oil Company | 1 | 55,000 | 55,000 |
| **VAL VERDE COUNTY** | | | |
| Mid-Kansas Oil & Gas Company | 25 | 80,000 | 2,000,000 |
| **WARD COUNTY** | | | |
| Atlantic Pipe Line Company | 2 | 55,000 | 110,000 |
| American Petroleum Company | 10 | 55,000 | 550,000 |
| American Petroleum Company | 5 | 80,000 | 400,000 |
| Gulf Production Company | 10 | 80,000 | 800,000 |
| Shell Petroleum Corporation | [2]2 | | 1,000,000 |
| Southern Pipe Line Company | 25 | 80,000 | 2,000,000 |
| Southern Pipe Line Company | 3 | 55,000 | 165,000 |
| The Texas Company | 9 | 80,000 | 720,000 |
| Texon Oil & Land Company | 5 | 80,000 | 400,000 |
| Tonkawa Petroleum Corporation | 1 | 80,000 | 80,000 |
| **WINKLER COUNTY** | | | |
| American Petroleum Company | 4 | 80,000 | 320,000 |
| Atlantic Oil Producing Company | 15 | 80,000 | 1,200,000 |
| Burford Oil Company | 1 | 55,000 | 55,000 |
| Cranfill-Reynolds Company | 7 | 55,000 | 385,000 |
| Cranfill-Reynolds Company | 1 | 80,000 | 80,000 |
| Gulf Production Company | 41 | 80,000 | 3,280,000 |
| Humble Oil & Refining Company | 10 | 64,000 | 640,000 |
| Humble Oil & Refining Company | 4 | 66,000 | 264,000 |
| Lion Oil Refining Corporation | 12 | 55,000 | 660,000 |
| Magnolia Petroleum Company | 16 | 80,000 | 1,280,000 |
| Pasotex Pipe Line Company | 5 | 80,000 | 400,000 |
| Pasotex Pipe Line Company | 3 | 60,000 | 180,000 |
| Pasotex Pipe Line Company | 1 | 55,000 | 55,000 |
| Prairie Oil & Gas Company | 3 | 55,000 | 165,000 |
| Shell Petroleum Corporation | 11 | 80,000 | 880,000 |
| Shell Petroleum Corporation | 7 | 55,000 | 385,000 |
| Southern Pipe Line Company | 20 | 80,000 | 1,600,000 |
| Southern Pipe Line Company | 3 | 55,000 | 165,000 |
| The Texas Company | 10 | 80,000 | 800,000 |
| Texon Oil & Land Company | 3 | 80,000 | 240,000 |

# EAST AND CENTRAL TEXAS STORAGE FACILITIES

| | | | |
|---|---|---|---|
| **ANDERSON COUNTY** | | | |
| Humble Oil & Refining Co. | 4 | 55,000 | 220,000 |
| Freestone-Limestone | | | |
| Atlantic Oil Production Company | 3 | 55,000 | 165,000 |
| Gulf Production Company | 20 | 55,000 | 1,100,000 |
| Humble Oil & Refining Company | 24 | 55,000 | 1,320,000 |
| Magnolia Petrolum Company | 16 | 55,000 | 880,000 |
| Magnolia Petroleum Company | 1 | 37,500 | 37,500 |
| Magnolia Petroleum Company | 1 | 25,000 | 25,000 |
| Prairie Oil & Gas Company | 5 | 55,000 | 275,000 |
| Pure Oil Company | 36 | 55,000 | 1,980,000 |
| Pure Oil Pipe Line Company | 9 | 55,000 | 495,000 |
| Pure Oil Pipe Line Company | 3 | 35,000 | 105,000 |
| Sinclair Crude Oil Purchasing Company | 63 | 80,000 | 5,040,000 |
| Sinclair Crude Oil Purchasing Company | 11 | 55,000 | 605,000 |
| Simms Oil Company | 13 | 55,000 | 715,000 |
| The Texas Company | 20 | 55,000 | 1,100,000 |
| **GRIMES COUNTY** | | | |
| Magnolia Petroleum Company | 3 | 55,000 | 165,000 |
| Pure Oil Pipe Line Company | 2 | 55,000 | 110,000 |
| **JASPER COUNTY** | | | |
| Magnoli Petroleum Company | 2 | 55,000 | 110,000 |
| **LEON COUNTY** | | | |
| Magnolia Petroleum Company | 15 | 55,000 | 825,000 |
| Magnolia Petroleum Company | 2 | 80,000 | 160,000 |
| Magnolia Petroleum Company | 2 | 35,000 | 70,000 |
| **NAVARRO COUNTY** | | | |
| Atlantic Oil Production Company | 5 | 55,000 | 275,000 |
| Atlantic Oil Production Company | 3 | 80,000 | 240,000 |
| Central-Texas Refining Company | 6 | 55,000 | 300,000 |
| Humble Oil & Refining Company | 4 | 80,000 | 320,000 |
| Magnolia Petroleum Company | 24 | 55,000 | 1,320,000 |
| Magnolia Petroleum Company | 9 | 37,500 | 337,500 |
| Magnolia Petroleum Company | 6 | 25,000 | 150,000 |
| Sinclair Crude Oil Purchasing Company | 2 | 55,000 | 110,000 |
| Skelly Oil Company | 2 | 55,000 | 110,000 |
| The Texas Company | 12 | 80,000 | [1]960,000 |
| The Texas Company | 8 | 55,000 | [1]440,000 |
| **PANOLA COUNTY** | | | |
| Magnolia Petroleum Company | 5 | 55,000 | 275,000 |
| **SABINE COUNTY** | | | |
| Magnolia Petroleum Company | 2 | 55,000 | 110,000 |
| **SHELBY COUNTY** | | | |
| Magnolia Petroleum Company | 2 | 55,000 | 110,000 |
| **VAN ZANDT COUNTY** | | | |
| Pure Oil Company | 3 | 55,000 | 165,000 |

(1) Includes tankage leased from Tidal Refining Company.
[2]Concrete reservoir.

# California Line Builders Were Busy Last Year

By BRAD MILLS
*Staff Representative*

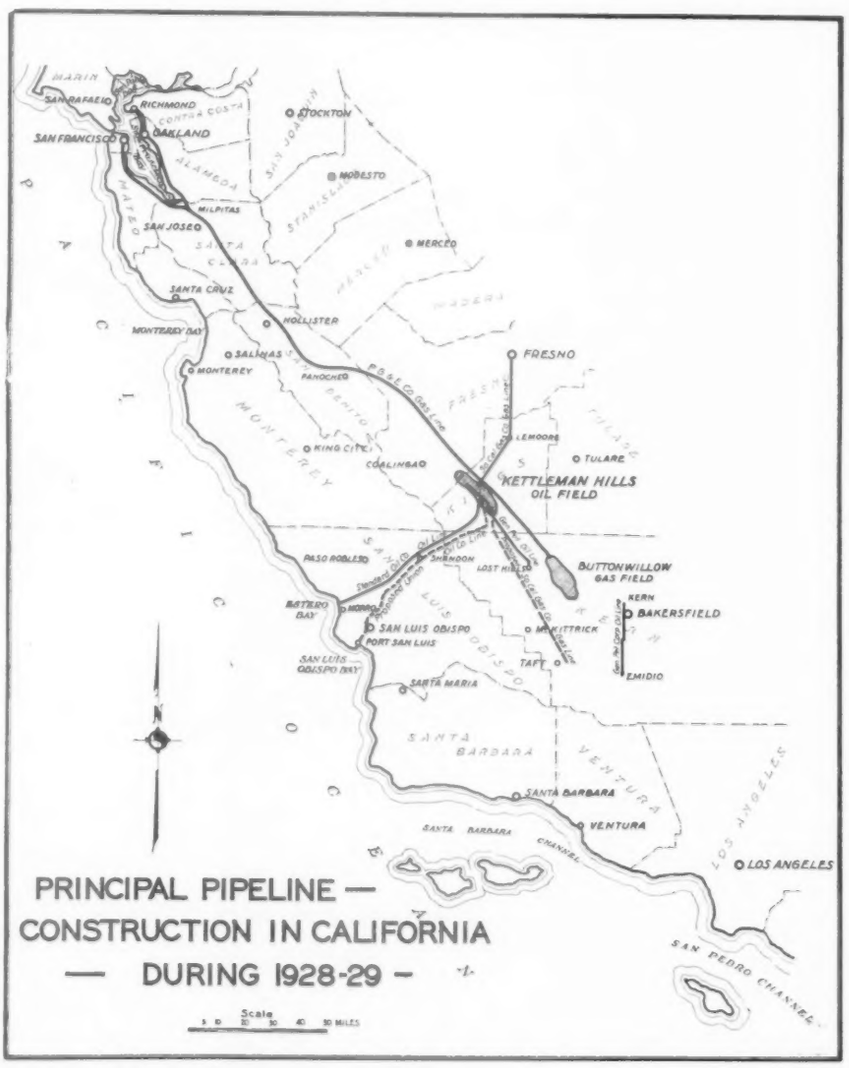
OVER-EXTENSION of pipe line facilities in California several years ago was followed by a period of comparative inactivity, during which few major projects were completed. This over-built condition was caused by the intense activity between 1920 and 1925. About a year ago, however, there was a distinct revival of activity and several important oil and gas lines have been completed or are now under construction. The discovery of new fields, rapid increase in the use of natural gas, construction of new refineries and the desire to parallel old lines in the Los Angeles Basin have combined to make the past 15 months the most important period in point of construction since the final year of the 1920-1925 cycle.

The entry of Keltteman Hills into the list of proven fields was the signal to start another pipe line system in California. This new area has been responsible for the bulk of activity since the fall of 1928. The fact that it produces both gas and oil and its large reserves have indicated a permanency which the major companies were quick to sense. Profiting by past experience, principal operating companies had learned to postpone construction of large pipe lines until new fields demonstrated their ability to produce consistently.

### Gas Line to San Francisco

Completion of a 285-mile, 16-, 20- and 22-inch gas line between the Kettleman Hills and Buttonwillow fields and San Francisco was the outstanding achievement of the year and was the first major pipe line project finished in this part of the state in several years. The line is of welded construction and was built by Pacific Gas and Electric Company to furnish an outlet for perhaps the most remarkable gas and oil field ever found in California. The main line starts at Kettleman Hills, with the auxiliary or emergency line extending southward to Buttonwillow. Between Kettleman Hills and Panoche Junction, a 41-mile stretch, the line is of 22-inch construction. From Panoche Junction to Milpitas, the division point where the line makes a "Y" to serve both sides of San Francisco Bay, 20-inch pipe was used. This is a distance of 109 miles and includes the roughest part of the right-of-way. Two lines lead to the Bay district from Milpitas, the San Francisco leg being a 20-inch, 45-mile stretch, while the extension supplying Oakland and other cities is 35 miles long and of 20-inch construction. The Buttonwillow - Kettleman Hills auxiliary line is 55 miles long and of 16-inch construction. The very latest engineering methods were used in building this 14-million dollar line. Welders were given tests to insure their fitness, applicants having been required to complete butt welds which would withstand a bend of 90 degrees without cracking.

Standard Oil Company of California, a pioneer in pipe line construction, completed a 70-mile, 10-inch, seamless, welded oil line between Kettleman Hills and Estero Bay, on the Pacific Ocean near San Luis Obispo. On one end of this line is perhaps the largest extremely light oil field in the world and on the other is the world's largest submarine oil-loading line. This new line provides an outlet for the company's production and is capable of caring for a great quantity of this type of crude. After the crude has passed through rectifyers to remove dissolved gases in the field, it is pushed through the entire line by heavy duty pumps operating at about 1000 pounds pressure, without the aid of intervening booster stations. The storage tanks receiving the oil are located fully a mile from the beach and on top of a ridge which makes an ideal site. The elevation is sufficient to load the oil into ocean



tankers by gravity at the rate of 20,000 barrels per hour.

General Petroleum Corporation built the first line to carry crude from Kettleman Hills, completing a 35-mile, six-inch line between the field and its Lost Hills pump station more than a year ago. This line makes possible the blending of light Kettleman Hills crude with the heavy product of Lost Hills.

General Petroleum Corporation provided an additional outlet for Kern Front crude, with the completion of a 30-mile, 10-inch line to the San Emidio Station. In marked contrast to the light oil, it is interesting to note that it was also necessary to build two pump stations in connection with this short line.

### Los Angeles Basin

Paralleling of old lines in the Los Angeles basin during the past year added, more than 200 miles of six-, eight- and 10-inch carriers to the vast network running between fields and refineries. General Petroleum Corporation and Richfield Oil Company particularly increased their capacities by adding lines of various sizes. The latter's new refinery at Torrance neccessitated construction of lines between the main tank farm south of Los Angeles and refinery storage. The Texas Company, Union Oil Company, Standard Oil Company, Shell Oil Company, Rio Grande Oil Company, Wilshire Oil Company and Associated Oil Company added to their gathering and distributing systems in the Los Angeles basin.

New ocean terminals were directly responsible for the construction of oil lines of various sizes. Rio Grande Oil Company and Hancock Oil Company completed up-to-date ocean loading terminals which are served with oil lines from Los Angeles basin fields.

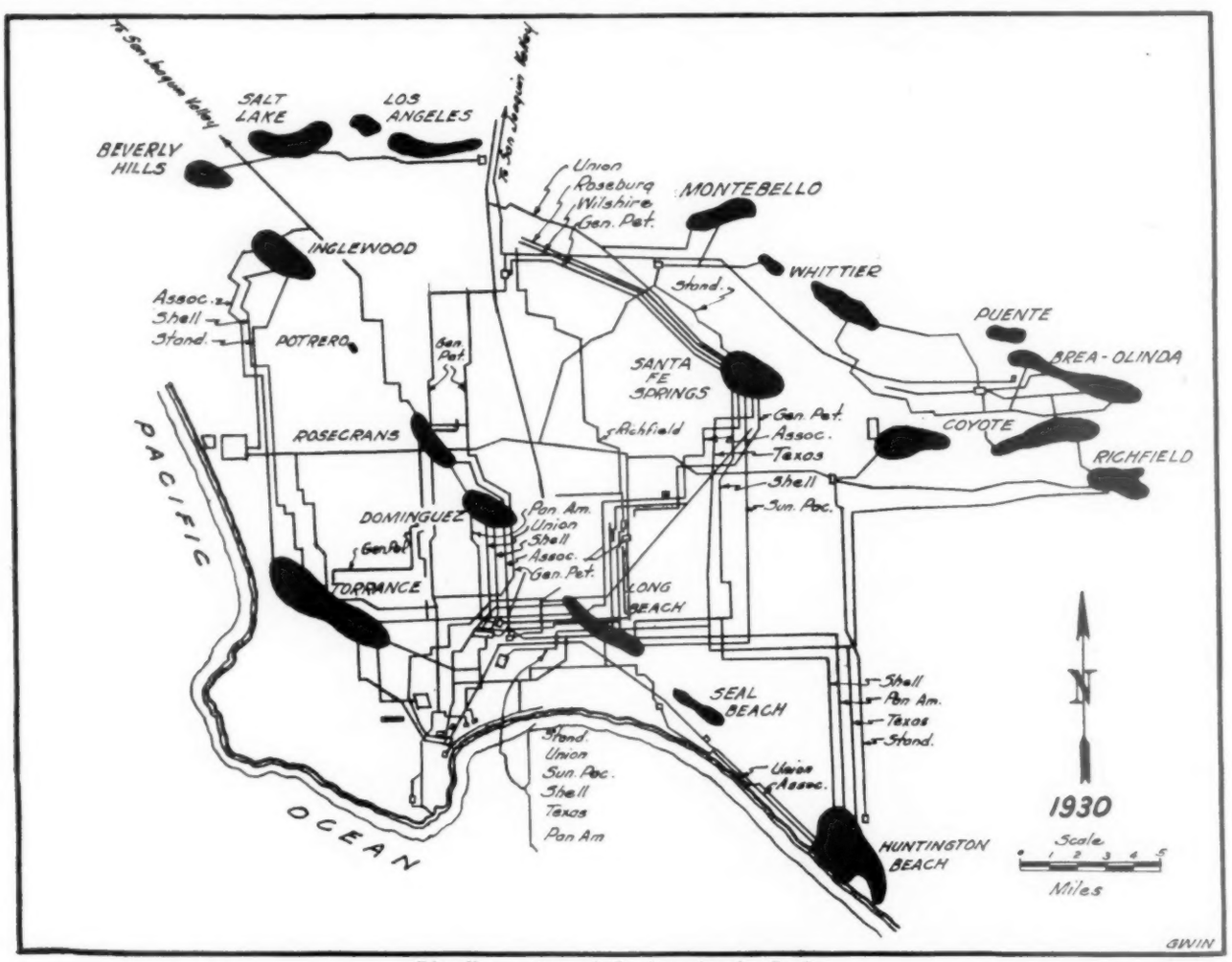
Kettleman Hills was responsible for the construction of a 10- and eight-inch gas line to serve Fresno and other San Joaquin valley cities. The line is more than 60 miles long, about half of which is 10-inch and the remainder eight-inch. The first leg of the line extends from Kettleman Hills to Lemoore and is of 10-inch construction, with the stretch to Fresno utilizing the smaller size. Several short four- and six-inch gas lines have been built to serve small cities off of the main line. Fresno will be the center of distribution of a large area.

Welded lines are fast replacing older types, both when used for natural gas and oil. Construction during the past year definitely established the welded seamless pipe line as the standard for California.

Union Oil Company has under way the construction of an 80-mile, six-inch line between Kettleman Hills and Port San Luis Obispo, on the Pacific Ocean. When completed the project will cost about $750,000 and will be one of the most important lines serving the new field. Actual construction was started March 1, the line to be in operation about May 1. The line will be used to handle natural gasoline until production at Kettleman Hills justifies the change to crude oil. The 80-mile line will start at Tar Canyon, a point on the Midway-Coalinga line near Kettleman Hills, run about 10 miles south and will veer through Cottonwood Pass to Cholame, from which point it will parallel the company's lines to Avila and Port San Luis Obispo.

The rapid increase in the use of natural gas will add to the state's pipe line system during the next year. The supply of this fuel is more permanent than at any time in the past and the building of gas lines probably will be as important as that of oil lines in the immediate future. San Joaquin Valley cities will be served and trunk lines running as far north as Sacramento are possible.

Permission has been granted to build a 70-mile line from Kettleman Hills to a point near Buena Vista Hills, the object being to complete a natural gas line between the new field and Los Angeles. The introduction of Kettleman Hills gas into Southern California will involve about 225 miles of transmission lines.




*Pipe line system of the Los Angeles Basin*

# Important Texas Line Projects Completed In Recent Months

FORT WORTH, Texas.—Pipe line construction activity in the interior districts of Texas during the past eight months has been mostly confined to small installations, while the first six months in 1929 was an exceptionally busy period by reason of finishing touches being placed on a number of major projects. The latter group were built largely to balance transportation facilities with daily production in West Texas, and their completion caused a slump in tank building and tank car shipments of crude.

Smaller companies contributed heavily to the total mileage of new lines completed in recent months. Phillips Petroleum Company has only recently completed 32 miles of six-inch welded line from field to pump station in the Bowers-Jackson area, Gray County, to the company's refinery near Borger. This line will be available for handling either crude or natural gasoline, although the former product is likely to be favored for the time being because of local market conditions.

Waggoner Refining Company started construction work early in 1930 on 28 miles of six-inch line from its West Electra tank farm and refinery to Iowa Park and Wichita Falls. This line was completed about February 22, and was built to deliver Wilbarger County crude produced from the fee lands of the W. T. Waggoner Estate to Wichita County, refineries on contract. Pure Oil Pipe Line Company of Texas has completed 11 miles of six-inch line in Archer County to replace a four-inch carrier extending from the Swastika field to station in the Turbeville area. This new line was started early in February, 1930, and gives the company a capacity of 10,000 barrels daily between the two points.

The longest of the small pipe line units built recently in West Texas was that of Burford Oil Company, which operates a skimming and cracking plant at Pecos, Texas, with a six-inch line connecting with the Hendrick field. The company started work early in February on about 35 miles of four-inch line from the Hendrick field to the Judkins field, and began filling the extension line with Ector County crude on March 1. Magnolia Pipe Line Company invaded the Judkins field with a six-inch line, using about 10 miles of pipe to extend from its West Texas system, and began filling the carrier with oil on March 3. Humble Pipe Line Company is at work on 13.2 miles of six-inch welded pipe line to tap the Judkins field, with an extension from the 10-inch portion of its Winkler County system. This line will be in operation before the end of March. It was originally planned to be an eight-inch carrier.

Landreth Production Corporation rejoined the ranks of the pipe line operators in West Texas for a brief period late in 1929 when a 14-mile eight-inch welded line built from the Taylor-Link field, Pecos County, to a tank farm and rack at McCamey. However, this line was purchased by Shell Pipe Line Company January 15, 1930, or before it had been operated for a full month.

Humble Pipe Line Company was the first carrier to tap the Taylor-Link field, using about 18 miles of six-inch line from the Yates field. Humble Pipe Line Company began construction work early in 1929 on the addition of three 10-inch pipe line loops for its Kemper-Ingleside system, and last May completed work on a 10-mile eight-inch extension line from Winkler County fields to the Jal field in Southeastern New Mexico.

The Texas Pipe Line Company wound up an aggressive pipe line construction program during the first half of 1929 through the completion of a combination 10- and 12-inch carrier from Jal, New Mexico, via important West Texas fields to a point near Houston, thence to Port Arthur, a distance of about 644 miles. Movement of New Mexico and West Texas crudes was started early in July, 1929. This trunk line was later extended to the northwest to the Lea field, with a 48-mile six-inch line, and also to San Antonio with a 46-mile six-inch carrier to serve The Texas Company's refinery at the latter point. Development of the Darst field, Guadalupe County, later necessitated the laying of 39 miles of six-inch line from Rosansky station. Promise of commercial oil production in the Rowan-Tong area, Pecos County, resulted in the company laying of a 12-mile six-inch line from McCamey station last October. The Texas Pipe Line Company built 21 miles of four-inch line from the Bulcher field, Cooke County, across Red River into Oklahoma to tap its Healdton trunk line as part of its 1929 expansion program.

### Gulf Loops

Gulf Pipe Line Company started and completed the largest pipe line expansion program of the year, having layed 409 miles of combination eight-, 10- and 12-inch loops from Midland station via Ranger, Wortham and Lufkin to Port Arthur, thus increasing the capacity on oil deliveries to the latter point to 125,000 barrels daily. This looping work was started in March and April, and was completed late in the summer. Gulf Pipe Line Company completed a 78-mile stretch of combination eight- and 10-inch line from Midland station via Judkins and Monahans to Winkler County late in March, and inserted a 20-mile eight-inch loop on its Midland-McElroy-Yates line.

Shell Pipe Line Company greatly contributed to the volume of finished lines in Texas when its 450-mile 10-inch carrier from McCamey station to Houston was completed in April, 1929. A branch line, consisting of about 37 miles of six-inch pipe, was built from Austin station to the Salt Flat field, near Luling, and placed in operation before the completion of the north end of the West Texas system.

Magnolia Pipe Line Company's largest project in 1929 consisted of a 63-mile 10-inch extension line from Midland station to the Hendrick field, and same was placed in operation on April 12. Prior to the laying of this line the company built 15 miles of four-inch line from its Hendrick field tank farm to the Scarborough field in northern Winkler County.

Col-Tex Refining Company completed construction work early in 1929 on 18½ miles of four-inch line to tap the shallow oil areas in the Howard-Glasscock district with an extension from its Mitchell County system. The California Company, principal operator in Mitchell County, is completing construction work on 11 miles of three-inch pipe to provide water for field use. In Taylor County, J. B. Dunigan and Fred Hyer built 2½ miles of two-inch line from the wildcat oil producer to a five-car capacity tank car rack near Tye station in December.

Atlantic Pipe Line Company and the Wickett Pipe Line Company provided connections for producers in the Shipley and other nearby pools in Ward County last summer. The former built 17 miles of six-inch line from its Winkler-Pyote system, while the Wickett Pipe Line Company layed 15 miles of four-inch pipe from refineries at Wickett, Texas. Reagan County Purchasing Company, which has a life time contract to purchase and run all oil produced in the Big Lake field up to 20,000 barrels daily, built 8½ miles of six-inch line parallel to its old system that extends from the field to Kemper tank farm.

The first unit of a trunk line to the Gulf Coast was completed from Van field to a tank car rack at Chandler, Texas, by the Pure Oil Company in December. This unit consists of 19½ miles of 10-inch pipe. Continuation of this line on to Smiths Bluff, near Beaumont, where Pure Oil Company has a refinery and tanker loading facilities, is now under way.

# Pure Starts Line to Serve Van Field; New Work in West Texas

FORT WORTH, Texas. — Pure Oil Company's trunk line from the Van field to the Gulf Coast is the only major project of its nature slated for construction in Texas during the early part of 1930, although a number of important crude line extensions are being contemplated in various sections of the state. Extension of West Texas pipe line systems across the state line into Lea County, New Mexico, promise to contribute materially to the new mileage in 1930. Legislation for pipe line companies in Texas is expected to retard the pipe line activities of the major interests until the latter group can have a showdown on their future rights.

The first unit of Pure Oil Company's trunk line system from the Van field toward the Coast was put in operation middle last December when 19½ miles of 10-inch welded line was built to a tank car rack at Chandler, Texas, for a temporary crude market outlet. The company will start work about March 15 on building this line south from Chandler to its refinery and tanker terminals at Smiths Bluff, located near Beaumont, using about 200 miles of 10-inch pipe. Five stations are scheduled to be used on the line, each being equipped with electric motor driven centrifugal pumps. The welding will be performed on contract by A. O. Smith Corporation, which is also furnishing the pipe. The balance of the construction work will be carried out under the direction of W. Mac Averill, head of the pipe line division of the Pure Oil Company in Texas, with headquarters at Beaumont.

Since the Van field's potential production is already in excess of the capacity of this first direct pipe line outlet, it is very probable that Humble Pipe Line Company and The Texas Pipe Line Company will invade the field with extension lines from Corsicana-Powell field or some other convenient point before the end of the year.

### West Texas

Ector County's lone oil field near the town of Judkins has been lately the principal source of new pipe line work in West Texas, and is assured additional pipe line connections in a few months. The Judkins field is facing a big production without immediate restrictions on drilling and output, and it is very evident that the Shell Pipe Line Company, The Texas Pipe Line Company and Atlantic Pipe Line Company will extend their respective lines into the area to provide market outlets for forthcoming production.

Extension of West Texas trunk line systems into Lea County, New Mexico, are being considered by the Atlantic Pipe Line Company, Shell Pipe Line Company and Magnolia Pipe Line Company as soon as their supply of controlled oil justifies such an expenditure. The recent revival of field work in the Hobbs field is opening the way for the former two companies to proceed with their pipe line plans by mid-summer. Atlantic Pipe Line Company has completed a tentative survey for a line to be built from its Midland terminal via the oil producing area to the Hobbs field, a distance of about 70 miles, while Shell Pipe Line Company would extend its line north from the Hendrick field. Magnolia Pipe Line Company's extension into New Mexico is awaiting completion of additional oil producers on its large leasehold. Humble Pipe Line Company is already serving the Jal field, located in southeastern New Mexico, and can be counted upon to extend same to the Hobbs field before the end of the present year.

Lockhart & Company, pioneer developers of the Wheat field, Loving County, Texas, are scheduled to start work shortly on the construction of 18½ miles of four-inch line from the field to a tank car rack at Pecos, Texas. The company is now shipping the oil in cars to El Paso over the Santa Fe, but will receive a more attractive rate in loading out at Pecos and using the Texas & Pacific Railroad.

Magnolia Pipe Line Company is very likely to enlarge its Mid-Continent trunk line system that extends across the state to Beaumont as soon as final approval is given by the government of the proposed merger of the Vacuum Oil Company and Standard Oil Company of New York. Magnolia Petroleum Company would fall heir to the responsibility of supplying a large portion of the choice crudes now being consumed by the lube plants of the Vacuum Oil Company. The latter has heretofore purchased the bulk of its crude requirements on the open market, which includes both independent and major producers, but with the merger in effect the producing subsidiaries of Standard Oil Company of New York will be given preference on supplying the demand. Magnolia Petroleum Company can obtain the desired volume of crude through controlled properties and outside purchases of lube oil materials, but an enlargement of pipe line transportation facilities across Texas would be necessary.

The proposed merger of the Sinclair and Prairie interests, with the Standard Oil Company of Indiana gaining full interest in the Sinclair Crude Oil Purchasing Company and Sinclair Pipe Line Company, may result in another trunk line for the West Texas district. Standard Oil Company's (Indiana) Middlewestern refineries have been heavy consumers of Winkler County oil that came from the properties of the Southern Crude Oil Purchasing Company in tank cars, and the oil is popular because of its anti-knock gasoline properties. Sinclair Pipe Line Company's system could be extended from the Central West Texas to West Texas at a reasonable expenditure, and the latter district is the most logical area in Texas to invade for a crude supply.

Preliminary survey for a pipe line route from Teague station to the Van field was completed last week by the Pure Oil Pipe Line Company of Texas, a subsidiary of the Prairie Pipe Line Company, but no plans have been made for the actual building of a line. Such a line would dequire about 70 miles of pipe.

# Empire Rumored Planning Line to Channel Refinery Site

HOUSTON, Texas.—Construction of approximately 500 miles of 12-inch line from the Oklahoma City field to a refinery site on the Houston Ship Channel is reported to be contemplated by the Henry L. Doherty interests to provide an adequate market for the large potential oil production offered by Indian Territory Illuminating Oil Company. The latter is the discoverer and major deevloper of the Oklahoma City field, and is a subsidiary of the Empire Gas & Fuel Company of Delaware.

A direct route from Oklahoma City via Gainesville, and Corsicana to a point near Houston would be followed in the construction of this crude transportation system. An aerial survey of the route is reported to have been completed. Empire Oil & Refining Company is operating a skimming and cracking plant at Gainesville, Texas, and receiving its crude supply via a small line from fields in South Oklahoma and the Texas Panhandle in tank cars.

The proposed refinery site on the Houston Ship Channel is reported to be below the plant recently completed by Shell Petroleum Corporation and near San Jacinto Battle Ground. An initial installation for the processing of 20,000 barrels of crude daily is credited with being on the refinery schedule. The surplus crude brought to the Gulf Coast above local refinery requirements would be made available for the Cities Service Refinery Company's 15,000-barrel plant at East Braintree, Massachusets. The latter concern is also owned by the Henry L. Doherty interests, and has been a major purchaser of crude in tanker lots from marketing companies on the Texas Gulf Coast and California points.

# Humble Starts Construction On Line to Refugio

THE first important pipe line construction plan to be announced for Southwest Texas or the Gulf Coast during 1930 is that of Humble Pipe Line Company, made public March 10, calling for immediate building of an eight-inch line between Refugio and Humble Oil & Refining Company's Ingleside refinery, total distance of 28 miles. In addition to supplying crude at the Ingleside refinery, the Humble Pipe Line Company will make shipments of unrefined oil at Harbor Island, near the refining plant. The company has a large crude loading terminal at Harbor Island, with ample capacity for loading deep draft vessels. Humble Pipe Line Company expects to have the line out of the Refugio field in operation between April 15 and April 20.

Since the opening of 1930 there has not been any pipe-line construction of importance in Southwest Texas or the Gulf Coast aside from completion of a new line from Refugio to Port Aransas that was started late in 1929. It is an eight-inch line of the Gulf Coast Pipe Line Company, laid parallel with the six-inch line that was installed in 1929. Total distance from Refugio to Port Aransas, where sea-going tankers are loaded, is approximately 32 miles. The Gulf Coast Pipe Line Company was acquired about February 15 by Moody-Seagraves interests from William F. Morgan of San Antonio. Midway between the field and the tanker loading terminal is a booster station at Bayside, and although the system is now handling only about 30,000 barrels of crude daily, it is expected to be able to handle 40,000 barrels daily soon through installation of additional pumps.

### Lines to New Fields

During 1929 various new oil and natural gas pipe-lines were put into operation. The new oil lines consisted principally of those built to serve the new fault fields, Salt Flat and Darst Creek, Caldwell and Guadalupe Counties, respectively, and the Refugio field, which developed during the year into an important oil field, although it had formerly been strictly a gas area.

Natural gas lines built during 1929 included major projects of Magnolia Gas Company and of the United Gas Company (Moody-Seagraves interests). Magnolia Gas Company invaded Southwest Texas in the spring of 1929 to supplement the natural gas supply for San Antonio and to sell gas in New Braunfels, and built about 115 miles of combination 14-, 18-, and 20-inch welded line, exclusive of gathering lines, to take gas from White Point, Refugio, Agua Dulce and other nearby fields. Construction work was started in May, and the line was in operation late in the summer.

United Gas Company's most important project was the construction of a 143-mile 12¾-inch natural gas line from Jennings, Zapata County, Texas, to Monterrey, Mexico, where both industrial and domestic consumers are now being supplied with natural gas. Monterrey has 80,000 inhabitants, and is known as the Pittsburgh of Mexico, because of its iron and steel industries.

Construction of the line to Monterrey was unusually rapid. The contract was signed June 14, 1929, and work was started shortly thereafter. Rapid progress was made from the beginning and maintained despite the necessity of having to cross the Rio Grande and pass through six Mexican towns, all of which are served by the line. Initial flow of gas through the line was ceremoniously observed December 3, 1929, by the lighting of a large gas flare in Monterrey. Commercial deliveries of gas were started about December 15, at the approximate rate of 18,000,000 cubic feet per day, on the basis of contracts already made, with expectations of increasing runs to 21,000,000 daily, the capacity of the line. With addition of a compressor station the capacity can be increased to 30,000,000 cubic feet per day, it is stated.

United Gas Company also built a gas line out of Refugio to serve towns between there and San Antonio, and plans later to enlarge upon that system. Details on that system are given in the accompanying table.

The Houston Pipe Line Company, subsidiary of Houston Oil Company, during the latter part of 1929 was engaged in important construction work, including a 10-mile loop or parallel line from Coleto Creek to the Guadalupe River, 20 miles of branch lines to the Driscoll, Kohler and Dinn gas fields, and 13 miles of 12¾-inch line from the mines of the Texas Gulf Sulphur Company at Long Point, Fort Bend County. Deliveries through that line were scheduled to begin early in March.

The accompanying tabulation presents details on the lines built during 1929 and early 1930 in Southwest Texas and the Gulf Coast, showing length of lines and sizes of pipe.

## New Pipe Lines in Southwest Texas

### OIL LINES

#### Salt Flat

Shell Pipe Line Company—Salt Flat to point seven miles from Austin, connecting with line out of West Texas, 37 miles, six-inch.

Humble Pipe Line Company—Salt Flat to West Columbia, 120 miles, eight-inch.

#### Darst Creek

Texas Pipe Line Company—Darst Creek to Sullivan railroad rack, six miles, six-inch. Sullivan to Rosanky Station, Bastrop County, connecting with West Texas trunk line, 39 miles, six-inch.

Magnolia Pipe Line Company—Luling tank farm to Darst Creek field, five miles, four-inch.

Humble Pipe Line Company—Darst Creek to Salt Flat tank farm, 12 miles, combination six-inch and eight-inch.

Simms Oil Company—Tank car rack at Luling to Simms-Penn's producer, four miles, three-inch and four-inch.

Grayburg Oil Company—Main line to L. C. Turman's Darst Creek production, eight miles, three-inch.

#### Refugio

Gulf Coast Pipe Line Company—Refugio to Port Aransas, looped line, 32 miles six-inch and 32 miles eight-inch.

Humble Pipe Line Company—Now under construction, Refugio to Ingleside refinery and Harbor Island crude loading terminal, 28 miles, eight-inch.

#### Miscellaneous

Gulf Pipe Line Company—Lynchburg to Dayton (rebuilt) 30 miles, eight-inch. From that line to Barbers Hill, three miles, four-inch.

Humble Pipe Line Company—Barbers Hill to trunk line, three miles, eight-inch.

(Continued on next page)

(Continued from page 79)

**NATURAL GAS LINES**

**To San Antonio**

Magnolia Gas Company—San Antonio to Mathis, San Patricio County, capacity 125 million feet gas daily, 60 miles, 20-inch, and 30 miles, 18-inch.

United Gas Company (Southern Gas Company)—Orange Grove to Agua Dulce, connecting field with Magnolia's line, 17 miles, 12-inch.

**To Monterrey, Mexico**

United Gas Company — Jennings, Zapata County, to Monterrey, Mexico, consisting of following sections: South Texas Gas Company, Jennings to Roma, 47.34 miles 12¾-inch o.d.; Roma, Texas, to Monterrey, line of subsidiary, Compania Mexicana de Gas, 96 miles 12¾-inch o.d. Total, Jennings to Monterrey, 143.34 miles 12¾-inch.

**Out of Refugio**

United Gas Company (South Texas Pipe Line Company)—Convert, near San Antonio, to Refugio, survey made for 103.62 miles 16-inch, but only 61.2 miles completed, from Convert south, remainder of construction suspended. Completed lines on this project as follows: Convert to point near Yorktown, trunk line, 61.2 miles 16-inch. Tap lines from trunk line (six-inch mostly): To Yorktown, 19½ miles; to Karnes City, 3.5 miles; to Poth, 5.2 miles; to Saspamco, 9.5 miles; to Kenedy, 3.8 miles; to Falls City, 5.2 miles; to Floresville, 5.2 miles.

**To Baytown**

Houston Gulf Gas Company—Crosby, Harris County, to Baytown refinery of Humble Oil & Refining Company, 16 miles, 12-inch.

**To Long Point**

Houston Pipe Line Company—From Boling to Texas Gulf Sulphur Company's new sulphur mine at Long Point, 13 miles, 12¾-inch.

**Miscellaneous**

Houston Pipe Line Company—From Coleto Creek to Guadalupe River, loop or parallel main line, 10 miles, 16-inch.

Houston Pipe Line Company—Branch lines to Driscoll, Kohler and Dinn gas fields, total 20 miles.

## South Dakota Well Being Rigged to Pump

Hot Springs, S. D.—Black Hills Petroleum Company is rigging up to pump its discovery well on the Barker structure 20 miles northwest of here. An estimated production of 25 to 30 barrels was obtained in the Minnelusa stand topped at 1328 feet. The company has locations made for three more tests, operations on the first of which will be started shortly. Field tankage amounting to 700 barrels has been erected.

Work is to be resumed immediately by Dillon Oil Company on the Provo structure, about 25 miles southwest of this town. This well is bottomed in the Opeche formation, with about 100 feet more to drill before reaching the Minnelusa.

# Oil Pipe Line Construction at Low Ebb in Louisiana-Arkansas

THERE has been little petroleum pipe construction in the North Louisiana-South Arkansas territory during the last year, most of the pipe-line activity having been confined to interstate gas lines from the Monroe and Richland fields.

In South Arkansas the Ouachita Valley Refining Company laid a four-inch oil line from Section 35-17-15, Union County, to Sections 7 and 8-18-14, to take care of oil in the Hillsboro district.

Two small lines were laid to the Mount Holly district of Ouachita County, Arkansas, last spring when that field gave promise of having considerable production. However, only a few small wells were completed. One of these lines was laid by Houston Oil Company of Texas from its refinery at Camden, Arkansas, to the Wilson wells of McDonald Brothers in Section 25-15-18 after the company acquired the McDonald interests.

Previously The Texas Company had laid a four-inch line to Section 25-15-18 from its tank farm in Section 23-15-17.

Steel tankage constructed in South Arkansas during the year included one storage tank of 55,000 barrels capacity built by Lion Oil Refining Company in Section 32-17-15 and two 10,000-barrel tanks in the same section built by the same company.

Houston Oil Company of Texas built four 20,000-barrel tanks in Section 35-13-17 and six tanks of 1250-barrel capacity in Section 35-14-17. Henry H. Cross Company built one 5000-barrel tank and two 2000-barrel tanks in Section 1-16-16 in Union County.

Steel tankage taken up in South Arkansas during the year included one tank of 55,000-barrel capacity in Section 2-17-15 which was destroyed by fire. The Continental Supply Company took up five 1000-barrel tanks during the year in Section 26-16-15 and Sun Oil Company did likewise with two 55,000-barrel tanks in Section 1-16-16. The Texas Pipe Line Company also took up one 37,500-barrel tank in Section 30-17-15.

Humble Oil Refining Company took up all its lines in South Arkansas, having sold its production there. The Texas Company took up an eight-inch line from Section 25-15-16 to Section 5-16-15, as well as a six-inch line from Section 28-15-15 to Section 3-16-15; a six-inch line from Section 4-16-15 to Section 3-16-15; a six-inch line from Section 5-16-15 to Section 25-16-16; a six-inch line from Section 30-17-15 to Section 17-16-15; a six-inch line from Section 27-15-16 to Section 15-15-16.

Imperial Oil and Gas Production Company also took up its six-inch line from Section 6-16-15 to Section 7-16-15, and a four-inch line from Section 7-16-15 to Section 9-16-15.

Only one loading rack of consequence was constructed in South Arkansas during the year, Ouachita Valley Refining Company's five-car rack in Section 35-17-15. Loading racks taken up in South Arkansas during the year included one 25-car rack of the Southern Pipe Line Company in Section 32-15-16; a 28-car rack in Section 1-16-16 belonging to Louisiana Oil Refining Corporation; one of similar capacity in Section 8-16-15 owned by the Magna Production Company; a 16-car rack of Humble Oil and Refining Company in Section 1-16-16; a three-car rack of the Southern Oil Refining Company in Section 21-16-15; and one 20-car rack of the Federal Oil Marketing Association in Section 2-16-16. All of these projects where not otherwise specified are in the Smackover field.

North Louisiana was also equally barren in new oil pipe line construction during the year. Dixie Oil Company laid approximately five miles of four-inch line from the Dixie field, 10 miles north of Shreveport, to connect with an unused line belonging to Magnolia Petroleum Company which the company leased. At Pine Island connection was made with the Dixie's line to a refinery at Superior. Standard Pipe Line Company also laid a gathering system in the Dixie field when that field reached importance during the summer of 1929 which connected with one of its trunk lines which was already near the Dixie field.

When R. L. Gay, Trustee's Bowman-Hicks 1, Section 14-7-14, Sabine Parish, discovered oil in the original Zwolle (Blue Lake) district coming in as a 50-barrel flowing well on Thanksgiving Day, 1928, Standard Pipe Line Company soon afterwards laid a four-inch line 19 miles to the well to take the production which has increased now to 650 barrels daily from four wells. The 500-barrel tanks were built in this part of the field. This line connected with the Standard's trunk line at Oxford, Louisiana.

On November 26, 1929, Gay completed Bowman-Hicks A-1, Section 34-8-12 as a 3600-barrel flowing well, extending the Zwolle area 12 miles east and slightly north. There had been no tankage built at the well before completion so a line had to be laid to the well quickly as the oil was flowing into temporary earthen storage. The line of four-inch size to Y in with the Oxford-Blue Lake line was laid in record time. Subsequently Standard Pipe Line Company laid 13 miles of six-inch line from the Pleasant Hill oil field in Section 32 and 33-10-12 to the well. Ten 500-barrel tanks were erected at the extension well before the lines were laid.

# Extensive Gas Line Construction In Rocky Mountain Area

IN the Rocky Mountain region the past year was marked by much natural-gas pipe-line construction work, the most important of which was the completion and the placing in use of Western Public Service Corporation's lines from the Baxter Basin (Wyoming), Clay Basin (Utah), and Hiawatha (Wyoming-Colorado) fields to Salt Lake City and Ogden, Utah, and to other Utah and Wyoming points. Another important system completed during the year was the gas line from the Jal area in Lea County, New Mexico, to El Paso, Texas. This 218-mile line was laid by Smith Brothers, contractors of Dallas, Texas, for the El Paso Natural Gas Company. The Cities Service Company through its various subsidiary companies built numerous branch lines during the year to serve various Colorado cities, towns, and industries with natural gas from the Panhandle of Texas. The main Amarillo-Denver gas line, it will be recalled, was completed by the Colorado-Interstate Gas Company in the early fall of 1928.

There was very little oil pipe line and storage construction in the Rocky Mountain area during 1929. A few short field gathering lines were built to connect new wells with existing systems, but outside of that there was little done. Southeastern New Mexico and Montana were the scenes of what little activity there was along this line.

### Montana

During the past year only two natural gas lines were laid in Montana. Perkins & Jones completed a line from the Bowdoin dome in Phillips County to the cities and towns of Malta, Saco, Glasgow and Bowdoin. In Glasgow, six and eight-inch pipe was used for the supply mains but four-inch pipe was used for the south side mains and those in the residential districts on the north side. The gas for this system is now coming from about a dozen shallow wells on the Bowdoin Dome, but Perkins & Jones have secured several thousand acres of leases on the Bowes Dome and expect to drill in this acreage in the near future. This same firm has secured gas franchises for Moosejaw and Regina, Canada, and announced in December, 1929, that lines will be laid to supply these points as soon as sufficient gas is assured." For the lines into Glasgow and Malta, the National Tube Company supplied 50 miles of 10- and 12-inch pipe.

The only other line laid was one between Conrad and Choteau, which line was completed and the gas turned in early in November, 1929. The gas is piped 58 miles from the Kevin-Sunburst field. The franchise for supplying the towns is held by the Pondera Valley Utility Company. The new line was laid after more than a year of investigation of the Pondera field field which, it was hoped, would provide an ample gas supply. However, most of the wells in this field showed only a flash production of gas, a condition that made it advisable to connect up with the Sunburst field.

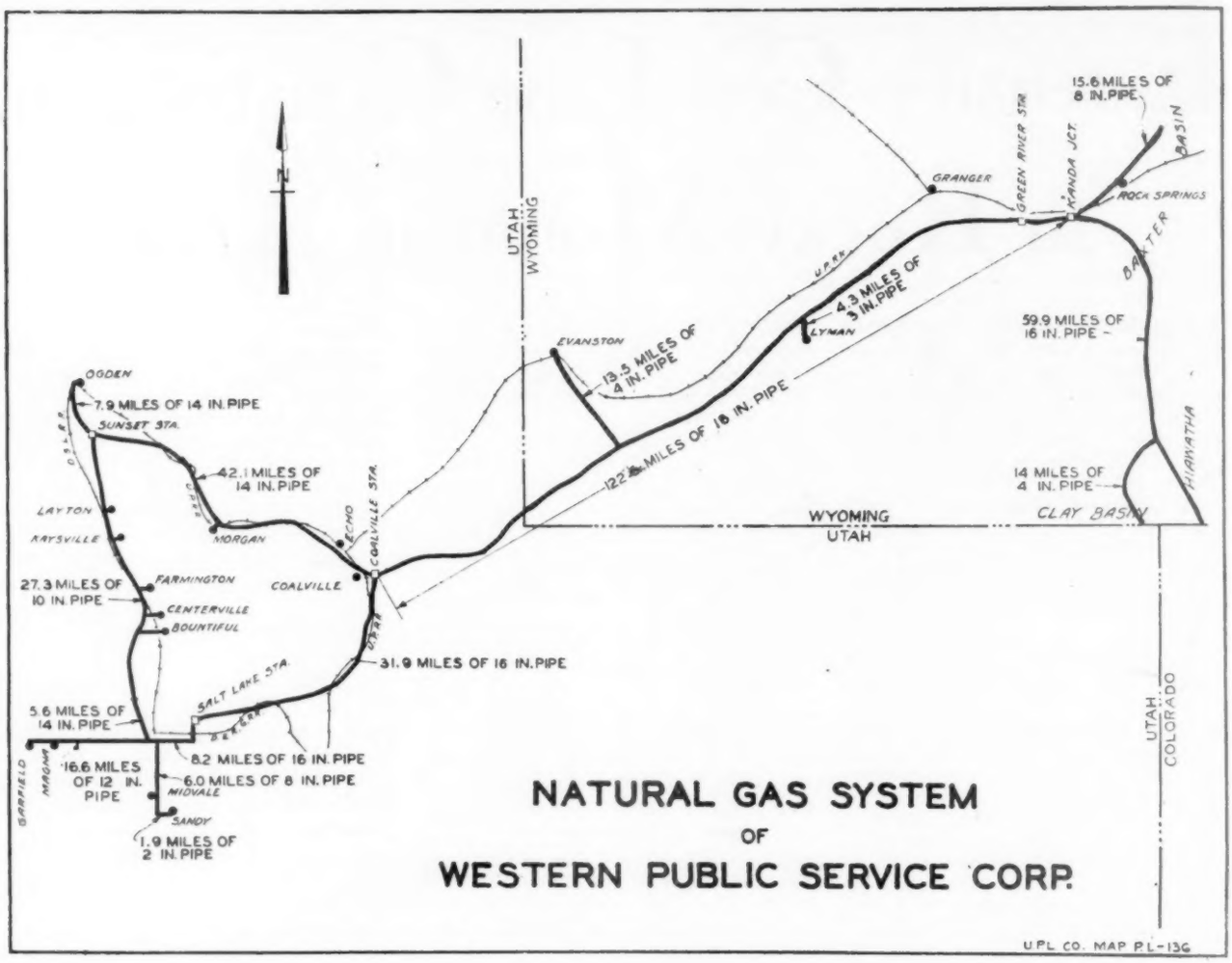
For 1930 two major gas-line projects are in the making. The Montana-Dakota Power Company will construct an eight-inch pipe line from the Cabin Creek field in southeastern Montana to Williston, North Dakota, a distance of 140 miles; and another line to Bismark, North Dakota. The company has also requested permission to extend the Williston line to Minot, North Dakota, and it is also understood that a further extension of the Bismark line is contemplated.

Within the past few weeks negotiations have been started for the construction of a line that would supply natural gas to the smelters in the Butte-Anaconda district. The Hope Engineering Company of Mount Vernon, Ohio, and the Moody-Seagraves interests of Houston, Texas, have so far been most active in the preliminary negotiations. The line would probably be built from the Big Horn Basin in Wyoming and Southern Montana, to Butte, Anaconda, Helena, and other Montana cities, towns, and industries. Such a line would be about 300 miles long and would cost approximately $20,000,000. An ample supply of gas is also available from Turner Valley, Alberta, Canada, but efforts to secure this gas for the Butte-Anaconda district are said to have failed because the Canadian government is unwilling to have gas exported out of the Dominion. However, if Canada should lift its export duty on natural gas, as is not impossible, then gas could be taken to the desired areas in Montana by building a 400-mile line.

*Creek Crossing in Utah*

Other gas line construction work that will likely be consummated in Montana during 1930 include the following: A 15-mile branch from the Shelby-Conrad line to Varier, Montana, which will make a total of 94 miles of line built in this area in approximately a 12-month period. The Jones & Perkins interests have recently completed an agreement to lay a line to Wolf Point in Roosevelt County, Montana. It is planned to drill some leases the firm has near Wolf Point and, if no gas is found, then to connect up with the firm's present pipe line running from Bowdoin Dome.

Pondera Utilities Company plans during 1930 to pipe gas to Williams, and possibly, to Bynum, Farmington, Agwam, and other towns in that section of Montana. Lewistown




is also to get natural gas this year, but no definite announcement has as yet been made as to where the gas will be obtained. With the lines already laid or to be laid in the near future by the Montana-Dakota Power Company, natural gas will be available at the very borders of Eastern Minnesota.

An oil line, 10 miles in length, of four-inch pipe, was laid from the Pondera field to the railroad and was completed and placed in operation in March, 1929. This line was partly laid by Pondera Pipe Line Company, but when Midwest Refining Company took over the Continental Development Company's acreage in the Pondera field, this partly constructed line was taken over jointly by Midwest Refining Company and the Ohio Oil Company, who thereupon completed it.

Several short oil lines, it has been announced, will be built in Montana during the present year: One is to be laid by the Consumers Pipe Line Company from the Bannatyne field to the Great Northern Railroad at Collins, a distance of about eight miles. The wells in this field produce from 10 to 25 barrels when pumped, but they have had to be shut in because of lack of outlet. It is expected that the new line to be built will provide an impetus for further development of this field.

Early in February, 1930, it was announced that two six-inch pipe lines, each about six miles long, were to be laid at once to the new Buckley or Red Coulee field, which lies across the international boundary east of Coutts and Sweetgrass. The plan is for Illinois Pipe Line Company to lay a line to Sweetgrass and a connection with this company's line from the Sunburst field on the Montana side; while Maple Leaf Refining Company will lay a line on the Canadian side to a connection with the company's refinery at Coutts. No information was available at this writing (March 6) as to whether construction work on these lines had actually been started as yet.

### Wyoming-Utah

As aforementioned, the Wyoming to Salt Lake City and Ogden, Utah, gas line was the most important project completed during the year, in the Rocky Mountain territory. The line was laid by the Uinta Pipe Line Company, which is the transportation subsidiary of the Western Public Service Corporation. The producing subsidiary of this same corporation, Mountain Fuel Supply Company, owns and leases the acreage, drills new wells, buys production, and constructs the gathering lines. Wasatch Gas Company is the distributing company for the Ogden-Salt Lake City districts, and also owns and operates the lines in this territory. Aspen Mountain Gas Company owns and operates 13.5 miles of four-inch line connecting Evanston, Wyoming, with the main line from the Baxter Basin field, and 4.3 miles of three-inch line connecting Lyman, Wyoming, with the main supply line. To date, the project has involved the construction of approximately 345 miles of gathering, transporting and distributing lines at a cost of close to $24,000,000.

The gathering system laid by Mountain Fuel Supply Company consists of 59.9 miles of 16-inch pipe running from Hiawatha Dome in Northern Colorado north to Kanda Junction, which is six miles east of Green River, Wyoming. This line is joined by 14 miles of four-inch pipe that "taps" the gas wells in Clay Basin, which is in Utah near the Wyoming-Utah border line. From North Baxter Basin 15.6 miles of eight-inch line was run to Kanda Junction, from which point a 16-inch line continues to Green River where it hooks up with the main gas transportation line built and operated by Uinta Pipe Line Company.

The lines that Uinta Pipe Line Company

(Continued on page 188)

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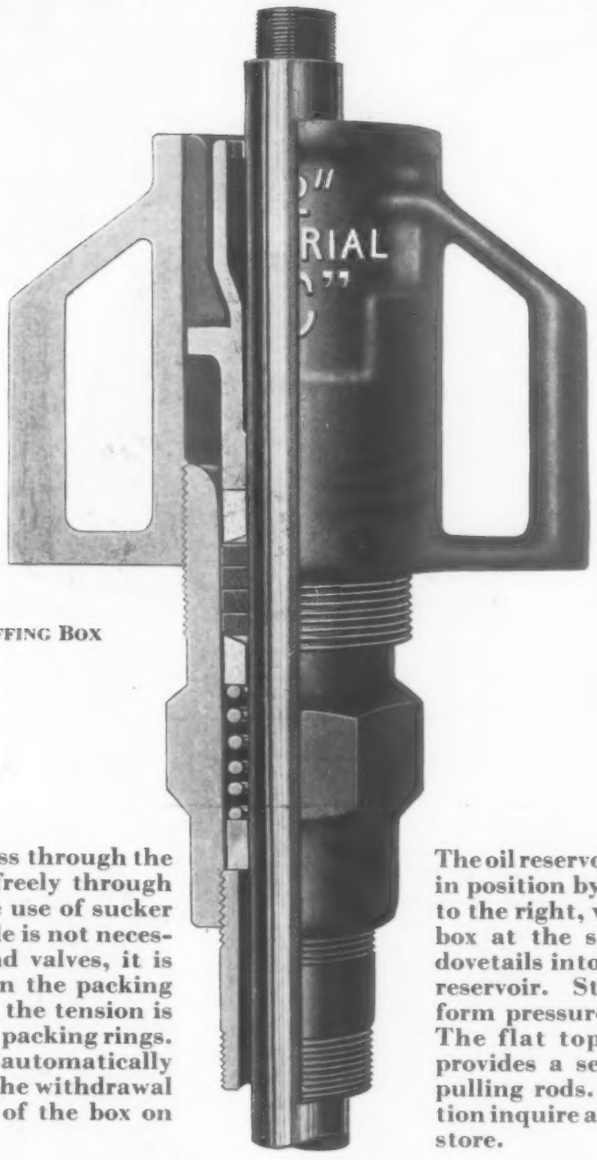


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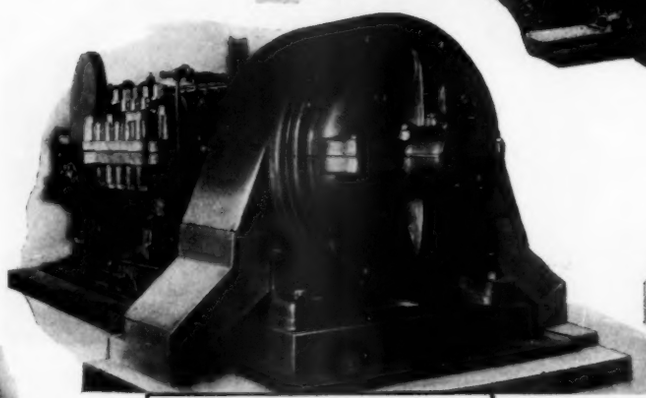
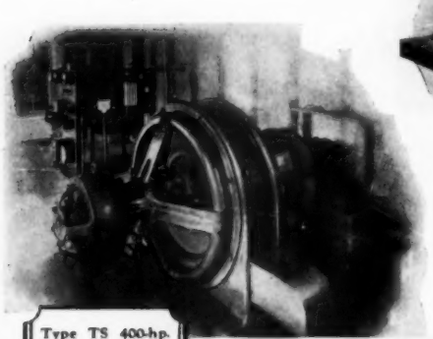
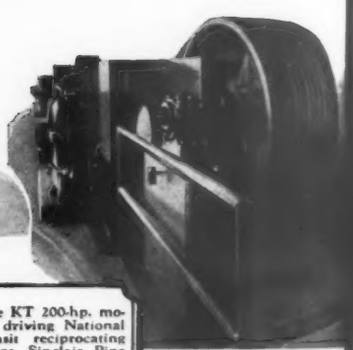


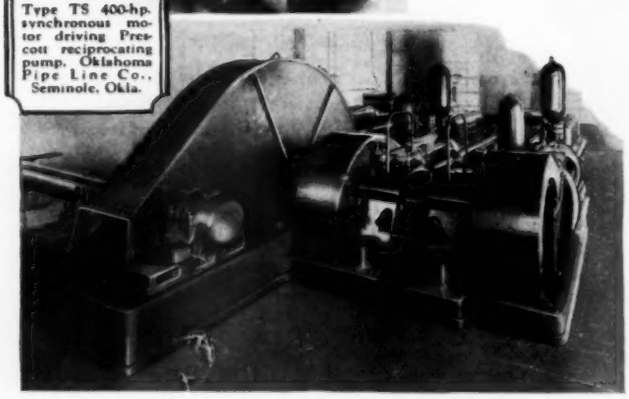
One of the largest motor-driven units in service. G-E 1000-hp. motor driving Cameron pump in station of Standard Pipe Line Co., Mandeville, Ark.

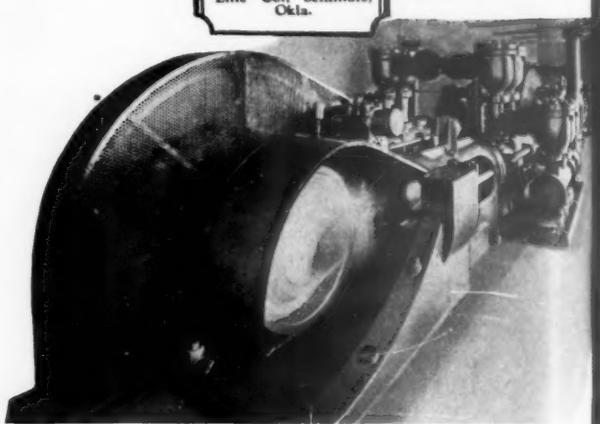


Type TS 400-hp. synchronous motor driving Prescott reciprocating pump, Oklahoma Pipe Line Co., Seminole, Okla.



Type KT 200-hp. motors driving National Transit reciprocating pumps, Sinclair Pipe Line Co., Seminole, Okla.





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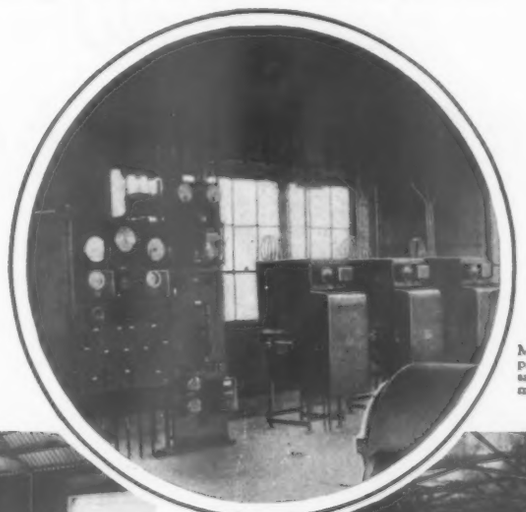
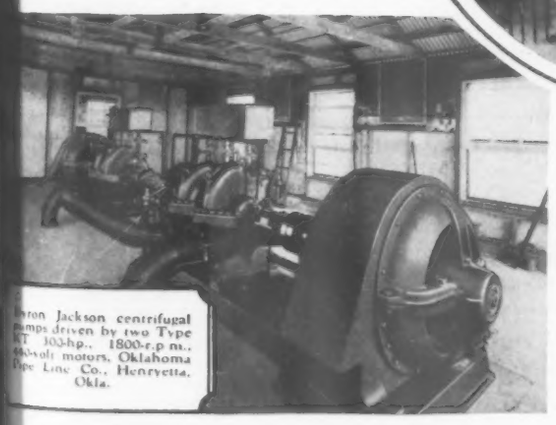


Master control panel, incoming-line panel, and three automatic compensators for 250-hp., 2200-volt induction motors, Magnolia Pipe Line Co. Bowie, Texas



Byron Jackson centrifugal pumps driven by two Type KT 300-hp., 1800-r.p.m., 440-volt motors, Oklahoma Pipe Line Co., Henryetta, Okla.

Six Type KT 250-hp., 1600-r.p.m., 2200-volt motors driving Worthington centrifugal pumps, Magnolia Pipe Line Co., McComb, Okla.

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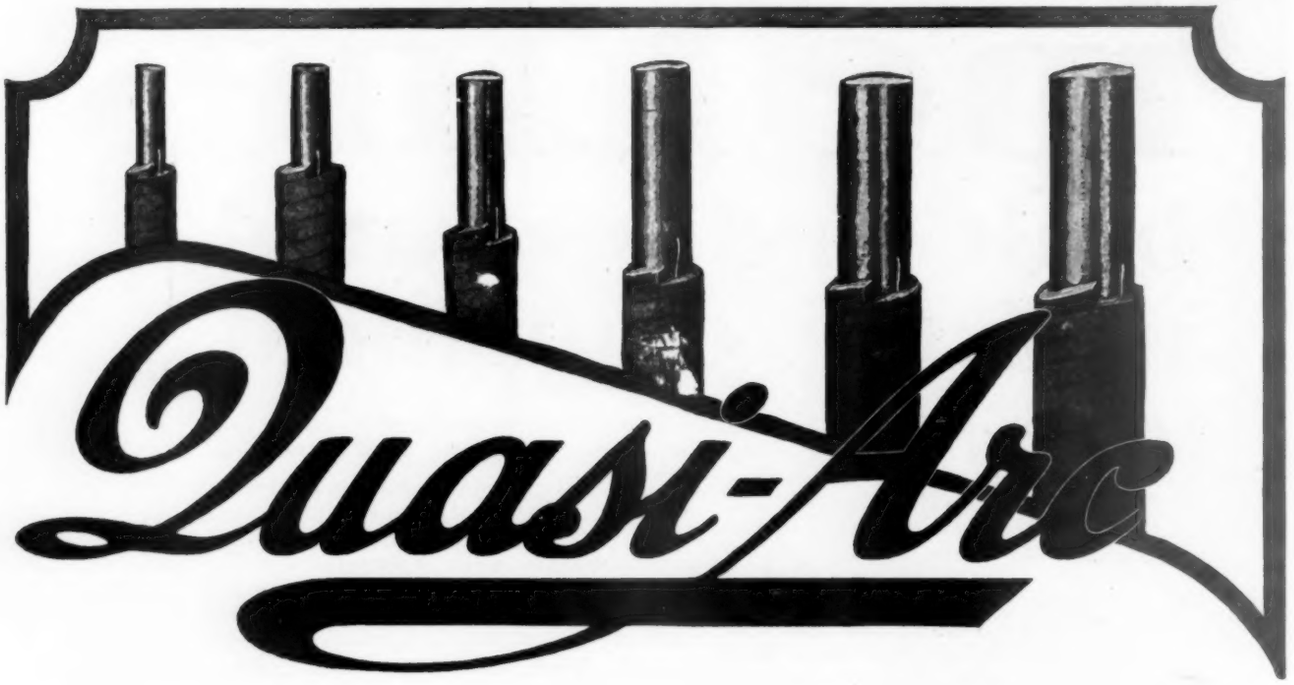


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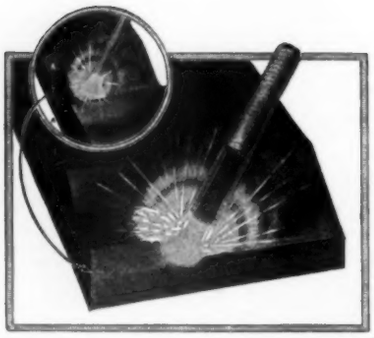

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# Little New Pipe Line Work in Oklahoma-Kansas

## One major project increases capacity to Middle-West; New fields served by short extensions to older lines

By WARREN BAKER
*Staff Representative*

FEW major trunk line jobs were commenced during 1929 in Oklahoma and Kansas, but one large line to Chicago and the enlargement programs of several other lines were completed during the year. The result was that the state had a larger outlet capacity to its principal marketing territory.

During November, 1928, Texas-Empire Pipe Line Company, owned 50 per cent by the Empire Oil & Refining Company and The Texas Company, was organized for the purpose of constructing a line from Drumright, Oklahoma, to Lockport, Illinois. This line constituted the only new major pipe line to be completed during 1929.

The main part of the line is 12-inch pipe. It has a length of 624 miles, with 200 miles of branch lines. The line serves the refinery of The Texas Company at Lockport and the new refinery of Empire Oil & Refining Company near Chicago. The line has a rated capacity of 50,000 barrels per day. It was completed in October, 1929.

Sinclair Pipe Line Company finished enlarging its main line by loops. The line extends from Drumright to Chicago. The new work consisted mainly of nine miles of eight-inch pipe, 278 miles of 10-inch pipe and 74 miles of 12-inch pipe. It was completed in January, 1929. This work increased the capacity of the company's trunk line from 50,000 barrels to 75,000 barrels.

Prairie Pipe Line Company completed a system of loops on its main line running 739 miles from the Panova station, near Shawnee, to Griffith, Indiana, east of Chicago. The loops consisted of 490 miles of eight-inch pipe. This increased the capacity of the company's line by 20,000 barrels.

### Oklahoma City Lines

In Oklahoma pipe line construction work was the most prominent in the Oklahoma City district. Foremost among the pipe lines here was Empire Pipe Line Company's eight-inch line from Guthrie, 32 miles. This project was completed early in March, 1929. At first it had a capacity of 22,000 barrels per day, but growing production in the field caused the company to increase the capacity through additional booster stations until it now has an outlet of 40,000 barrels per day.

Prairie Pipe Line Company laid an eight-inch pipe line from Shawnee, Oklahoma, to Oklahoma City, 45 miles. This line has now been doubled. Sinclair Pipe Line Company completed a 30-mile line from its main line at Payson, to Oklahoma City. It was an eight-inch line. Shell Pipe Line Corporation laid an eight-inch line from its main line at a point northwest of Shawnee. Oklahoma Pipe Line Company (Standard Oil Company of New Jersey) built an eight-inch line from Cushing. Magnolia Pipe Line Company laid 41 miles of eight-inch from its station at Purcell.

In addition to these pipe line outlets, Tidal Oil Company built a gathering system, delivering the oil to Magnolia Pipe Line Company for shipment. Healdton Pipe Line Company (Coline) was handling 5000 barrels per day at its loading racks; The Turley refinery loading racks can handle an equal amount; and the Indian Territory Illuminating Oil Company have a 50-car rack.

The Asher field early in 1929 demanded several lines. Prairie Pipe Line Company was one of the first into the field, laying a short extension to the then new pool. Sinclair Pipe Line Company constructed a six-inch line from a station in the St. Louis pool; Consolidated Pipe Line Company laid a four-inch line from Pearson Switch; and The Texas Pipe Line Company built eight miles of six-inch line.

Sinclair Pipe Line Company during the year laid a 10-inch line from its station near Earlsboro, Seminole County, to Hominy, Osage County. This company also finished 34 miles of 10-inch line from Payson to Drumright and another 28-mile line of eight-inch pipe from Payson to Earlsboro.

Cosden Pipe Line Company completed a six-inch line, to serve as loop to its main line, from Mounds, Creek County, to Henryetta, Okmulgee County. It also laid nine miles of three-inch gathering lines in the Weleetka area.

New development work in the East Earlsboro and East Little River pools required a few miles of extension. Several short extensions were also required in the vicinity of the St. Louis pool.

Champlin Refining Company laid a four-inch line to Magnolia Petroleum Company's wildcat well near Perry, Noble County.

### Kansas

Pipe line construction work in Kansas consisted mostly of short lines to new producing areas. Development of production in Sedgwick County and McPherson Couty called for new lines, while in Western Kansas several gathering systems were completed.

Prairie Pipe Line Company built a 20-mile six-inch line from Towanda, Butler County, to Sedgwick County. It was completed early in February, 1929, and aided materially in caring for the increasing production. This company also laid a six-inch line from its Walnut station, in Butler County, to the Robbins pool, south of Wichita, in Sedgwick County. This company also laid 38 miles of eight-inch line from Marion County to the Ritz Pool of McPherson County. It extended a line from its Florence station to the Hillsboro pool of Marion County.

Skelly Oil Company, White Eagle Oil & Refining Company and Empire Pipe Line Company reconditioned an old 12-inch water line running from Valley Center, Sedgwick County, to Eldorado, 20 miles. It could handle 40,000 barrels per day, and several companies from time to time used the line to transport oil to other places.

Marland Pipe Line Company completed a line from Valley Center, Sedgwick County, that tied into its trunk line running to its Ponca City, Oklahoma, refinery. It tied into its main line at Oxford, Sumner County, Kansas.

Shell Petroleum Corporation finished a four-inch line from its Arkansas City refinery to Sedgwick County, then laid a sixty-mile six-inch line to the Voshel pool from Sedgwick County.

Derby Pipe Line Company laid a line from its Wichita refinery to the Voshel pool, McPherson County.

In Western Kansas, Phillips Petroleum Company built 21 miles of 4-inch gathering lines to its loading rack at Ellis County, Western Kansas.

In addition there were a number of other smaller developments completed to various new outlying producing districts.

### Natural Gas Lines

Natural gas pipe line work during 1929 in Oklahoma and Kansas was very small, with the exception of several lines that crossed the states, but found the source of supply in the Texas Panhandle.

Foremost among such work was Empire Gas & Fuel Company's gas line run-

ning from the Texas Panhandle northeast across northwest part of Oklahoma into Kansas, thence to Kansas City.

Leading all other gas lines within the state was the announcement that the Cities Service Gas Company would lay a 16-inch line from near Perry, Oklahoma, to the Oklahoma City field. Work has just been commenced on this line.

Industrial Gas Company has laid 10-inch pipe line from the Oklahoma City pool to various industries in Oklahoma City.

A line from the Texas Panhandle was laid to Enid, Oklahoma, which also supplied natural gas for fuel to a number of towns and cities en route. With several of the major gas lines running through Northwestern Oklahoma, several towns tapped into the lines for gas.

Harris & Haun laid a combination six- and 8-inch line from its Swenson booster station, Vernon pool, Kay County, Oklahoma, 23 miles to the city gates at Winfield, Kansas.

Cities Service Gas Company laid 50 miles of line from Petrolia to Fort Scott, Kansas. It also completed work on 15 miles of welded gas lines from its main lines at Saginaw, near Joplin, Missouri, to Neosho, Missouri.

This company connected Falls City, Nebraska, and other Kansas and Nebraska cities with gas with an extension line from Atchison, Kansas.

Pipe line construction during 1930 in Oklahoma and Kansas is not expected to equal the amount of major work done during the past couple of years. Increased outage available through the enlarged trunk lines to the Middle West refineries and marketing territory promises to take care of marketing demands from consumers at this point.

Some of the trunk lines serving the Middle West Territory from Oklahoma and Kansas may be increased in capacity, but the work during the past couple of years on most of the lines indicates that the work will not be as large. Texas-Empire Pipe Line Company is already increasing the capacity of its new line to Chicago, by the installation of additional pumps. Rumors are that another trunk line may be laid from Southern Oklahoma to the Gulf Coast. This practice of having lines running to the Gulf Coast as well as to the Middle West Consuming points is increasing.

### Natural Gas Lines

Empire Gas & Fuel Company's line now being started from Perry, Oklahoma, to the Oklahoma City pool will probably be the largest natural gas construction work within the state. The Oklahoma City region offers large gas reserves and short lines from the field may be laid during the year.

Short gas lines in both Oklahoma and Kansas, except those that may cross the state from other points, seems to be the prospect for 1930.

The Barnsdall Company proposes to build a gasoline line from Oklahoma to Chicago, which should be the largest pipe line construction work from the state during the year, if carried out.

# Navy Now Fuels Ships in Motion Result of Airplane Experience

By G. K. SPENCER

FOR some years, the navy of the United States has been fueling its ships at sea, from tankers. A practice has been evolved by which two ships might avoid the known centripetal attraction while lying near each other, and exchange fuel oil through metal hose. To effect this transfer of fuel, it has been necessary for the two vessels, generally a tanker and a destroyer, for larger vessels carry sufficient supplies of their own for long cruises, to maintain steerage way.

For nine years, the fleets have been annually refueling the entire destroyer squadrons at sea as a normal operation. But, it has not heretofore been possible to conduct the work while steaming, let us say, at anything over three or four knots.

Now, as a result of research made available by the handling of hose and lines between aircraft in flight, during the momentous series of refueling experiments completed by American pilots over the past five years, the refueling operation at sea has been worked out to where tankers may transfer fuel oil to destroyers at speeds upwards of five to ten knots. The value of this is perhaps more apparent to the naval officer than to the layman. But a simple illustration will be convincing. Let us assume the United States fleet, with its destroyer squadrons, either giving chase to, or fleeing from, an enemy. Upon the rendezvous with the tankers, the chase can be continued or the flight persisted in, while taking fuel oil. The difference in speed, let us say, of only six knots an hour, might, in a single refuel, spell the difference between a very satisfactory or a very unsatisfactory action. It might avert the loss of valuable ships or squadrons.

In the accompanying photographs, made especially for this article, it will be observed that the apparatus is rather similar to that used by aircraft, and the principle of handling it precisely the same.

The towing lines assist in maintaining an average distance, while hoists maintain the fuel hose in a constant pliable position, permitting of considerable lee-way.

The interest of the officers in the operation may be surmised by a glance at the destroyer's bridge, where all commissioned personnel are observing the work of fuel transfer. It will be utilized in the naval maneuvres planned for this spring in both the Pacific and Atlantic fleets, or, more properly speaking, the battle and scouting fleets.

Hard upon the heels of this development, the navy is now working out a method of transferring fuel to submarines, submarine chasers, and larger vessels.

Fuel transfer to torpedo and scouting planes will also be practiced, and refueling of torpedo plane squadrons, from destroyers, with both craft hove to on the scouting line, is another naval practice.

*Navy boat fueling at sea and in motion*

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# Curtailment Tendency Halts Tank Building in Mid-Continent

By WARREN BAKER
*Staff Representative*

THOSE who have followed closely the crude oil storage situation in Oklahoma-Kansas during the past year have seen several important developments. Among these have been the growing tendency of most companies to carry lower crude stocks; the general improvement in the storage situation, with the exception of refined products; present withdrawals from storage; and practically no storage construction during 1929 with prospects small for 1930.

Perhaps the most important development in the storage division of the petroleum industry, at least one that will interest the general industry to a larger extent, is the apparent tendency of nearly every company to carry small crude oil stocks. Approximately 20,000 barrels per day is being withdrawn from storage in Oklahoma-Kansas, with practically every major company participating in the draft on stocks, with one exception.

Despite this, prices are lower for crude oil and the oil being withdrawn from storage is causing these companies to take a loss, yet they appear quite willing to continue the draft on stocks. Crude stocks have been quite heavy in the past, especially considering the large amount of fresh oil available if the fields were opened. Heavy storage carried from year to year has proven of little benefit to most companies and the cost of storage has increased the cost of most of this oil until it is beyond profit.

### Little Oil Stored in 1929

Despite the heavy crude oil production potential built up in Oklahoma-Kansas during 1929, when the Oklahoma City field, East Earlsboro, Konawa, several extensions to St. Louis, Valley Center, Greenwich, Voshel and other pools were at their peak or being discovered, there is a general healthy condition in the crude oil storage situation of these two states at this time, decidedly better at least, with the exception of refined products, than at any time in several years.

There was practically no oil stored in the two states during 1929. On December 31, 1928, 129,364,025 barrels of oil was in storage tanks, not counting pipe lines or work tanks, whereas on December 31, 1929, there were 129,528,740 barrels in storage, an increase of only 164,715 barrels over the year, or a daily increase of little more than 450 barrels. During the early part of the year some crude went to storage, but drafts during the latter part reduced this amount until it amounted to practically nothing.

Oklahoma had 114,683,550 barrels of crude oil in storage on December 31, 1928, as compared with 113,572,175 barrels one year later, or a decrease of 1,111,375 barrels. Offsetting this decline in Oklahoma, Kansas for the same dates increased its storage 1,276,090 barrels, having a total at the end of 1929 of 15,959,565 barrels compared with 14,680,475 barrels at the start of the year.

### Conservation Aided

The small amount of storage increase shows how well Oklahoma-Kansas oil producers curtailed production to market demand.

Prairie Oil & Gas Company, largest shippers of oil from the Mid-Continent, has approximately 55,000,000 barrels of the 129,528,740 barrels in storage. Sinclair Oil & Gas Company has about 15,000,000 barrels. The remainder or about 60,000,000 barrels is divided among all other companies.

Of interest in connection with Prairie Oil & Gas Company's position is the fact that while in Oklahoma-Kansas they are not adding any storage, heavy runs to storage in Texas is causing them to store between 7000 and 8000 barrels per day at the present time. Despite the fact that this company has the largest storage facilities of any company, its heavy storage of crude has practically filled its room. In the future it will probably make only the connections necessary to maintain an even break with its demand from buyers, as the company policy seems to be not to reduce its storage, at least at the present prices.

As long as the strict conservation measures are enacted, as they have been during the past year in Oklahoma-Kansas, there seems to be no reason why the drafts on stocks of oil should not continue, especially considering that the heavy consuming season of spring and summer will soon be at hand.

### Little Tankage Built in 1929

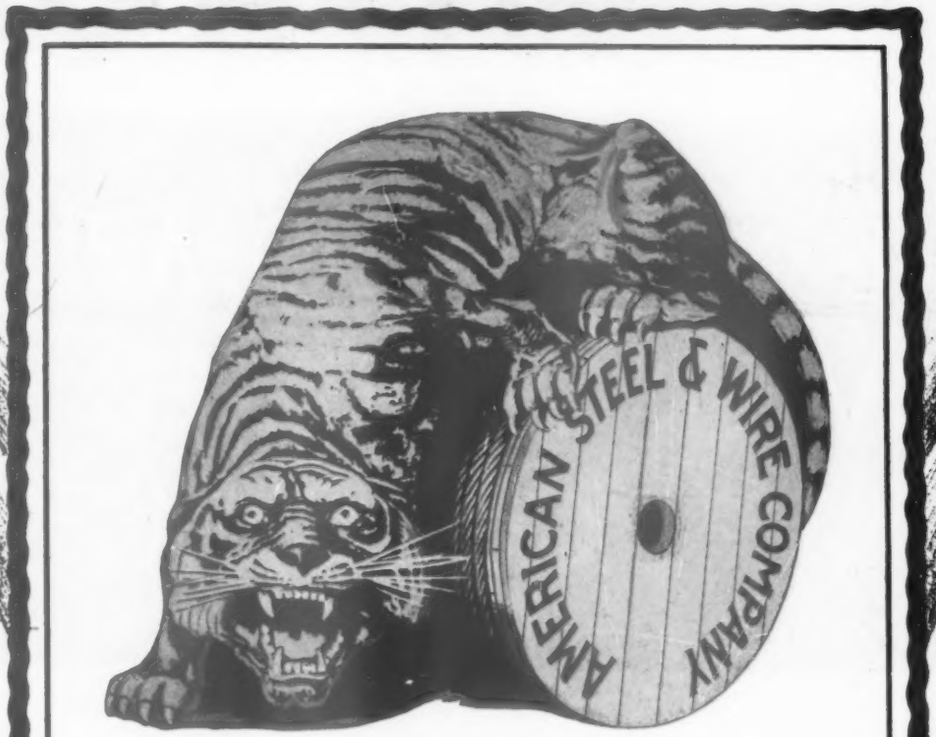
Oklahoma-Kansas added little additional storage during the year. The little building done consisted of storage tanks at scattered points, and principally in the new producing areas, where pipe lines were unable to care for the production.

The Oklahoma City field was the most active from this standpoint with several companies erecting tanks to care for surplus production, but it was not even the rule in this congested pool. Indian Territory Illuminating Oil Company, Empire Pipe Line Company and Magnolia Petroleum Company led in this respect at Oklahoma City, with practically all purchasers and producers building a few tanks.

Indications are that 1930 will also be a small year from a storage building standpoint. Oklahoma-Kansas are different from many areas in that during the past years a large amount of above ground storage has been built and there is little desire to increase these facilities.

As long as proration is continued to its strenuous degree there probably will be little storage construction, except for working purposes.

*Excavating an earthen Storage Reservoir in Arkansas*

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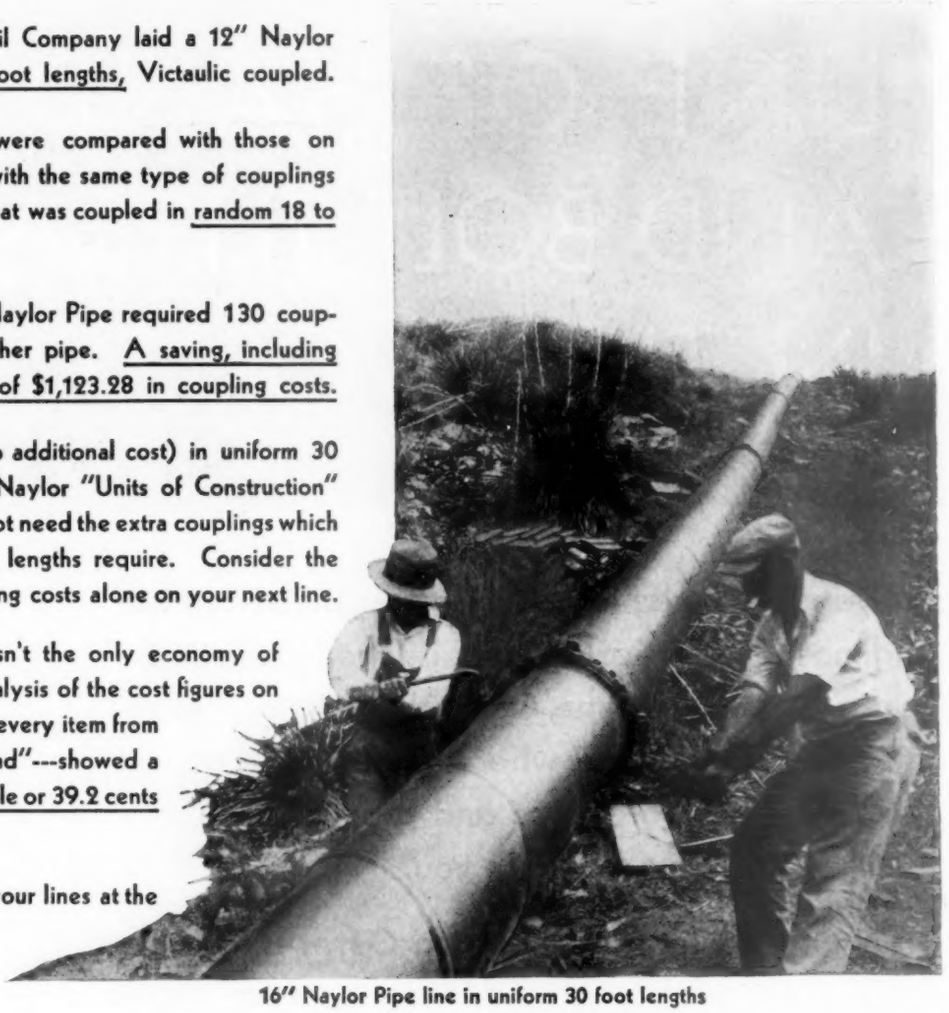

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*Typical Los Angeles Basin tank and concrete reservoir farm. Richfield Oil Company's Watson refinery in the foreground.*

# California Storage Building Slow Despite Increasing Output

By BRAD MILLS
*Staff Representative*

ADDITIONS to California's storage facilities during the past year hardly equalled half of the increase in petroleum stocks during the period, a disparity which has resulted in a very limited amount of room. Ordinarily this narrow margin would precipitate a construction campaign, but producers are more observant of economic laws than formerly and think twice before building additional storage. Over-building has taken a heavy toll in the past, even if actual cost of storage has been secondary to the expense of carrying unneeded stocks.

Over-production, tank-building and hard times have gone hand and hand in California for a generation and all operators are working in a common effort to get away from all of these three troublesome factors. Despite a reluctance to launch upon a major construction program, more than 20 million barrels of storage was added in California during 1929. Some of this was started late in 1928, but actual completion fell during the past year.

At least two major companies ran short of room during 1929 but both refrained from starting ambitious construction programs. At one time one of the largest purchasers in the state had only three weeks of empty storage ahead, but curtailment, feeble as it was in some instances, prevented an absolute slopping over of crude tanks.

During previous periods of over-production, steel and concrete storage was rushed to completion with little thought of the future. Fortunately the supply proved sufficiently stable to fill most of this emergency room, but unfortunately much of these stocks have been carried for several years at an actual loss, particularly in the case of heavy crudes.

### Trend to Steel

There was a very pronounced trend toward steel storage during 1929, as shown by the percentage of this type

**CALIFORNIA STORAGE CAPACITIES**
(Corrected to Jan. 1, 1930)

| Location | Steel | Concrete | Earthen | Wooden | Total |
|---|---|---|---|---|---|
| Los Angeles Basin.. | 80,724,000 | 59,644,000 | 4,000 | 9,000 | 140,381,000 |
| Ventura and Santa Barbara Counties . | 3,629,000 | 6,000 | 16,000 | 170,000 | 3,821,000 |
| San Joaquin Valley, San Luis Obispo County . ..... | 24,827,000 | 19,571,000 | 19,830,000 | ..... | 64,228,000 |
| San Francisco Bay District and Northern California .... | 26,304,000 | 3,765,000 | ..... | ..... | 30,070,000 |
| Total . .....| 135,484,000 | 82,986,000 | 19,850,000 | 179,000 | 238,500,000 |

*An earthen concrete lined reservoir in California for the storage of crude oil. This reservoir holds 1,000,000 barrels.*

of the total built during the year. All storage under construction is steel type, but when conditions warrant the operation of the heavy oil fields of the San Joaquin Valley, concrete reservoirs probably will be built in the Bakersfield district.

Overproduction of light oil has always been reflected in an all-steel type of construction, and the building of tanks last year was the natural result of the excess output. Concrete storage has proven fairly satisfactory for heavy oil and fuel oil, but has not been a success with the lighter products.

The Los Angeles basin was the center of activity in the construction of steel storage during the past year. This is the logical location, as the chief overproduction is here and nearly all products are exported from the Los Angeles harbor. This district has become one of the greatest storage centers in the world, having a total capacity of more than 140 million barrels. Of this total, steel storage amounts to about 81 million barrels and concrete accounts for the remainder.

A little less than one million barrels of steel storage was built in the San Francisco Bay district during the year. The great refineries in this area have been responsible for the present total of 30 million barrels. This is divided between a little above 26 million barrels of steel storage and less than four million barrels of the concrete type.

Total storage capacity of California is 238,500,000 barrels, but of this figure much is in a very bad state of repair. The 64 million barrels listed in the San Joaquin Valley includes nearly 20 million barrels of earthen storage and a similar amount of concrete storage.

A casual glance discloses more than 50 million barrels of empty storage in California, but this figure is misleading. Of the total available, fully half probably could not be used except in an absolute emergency, while it is doubtful whether more than one-third of the total empty space could be used for lighter products. The 20 million barrels supposedly available in the San Joaquin valley is obsolete and in a bad state of repair. This applies chiefly to earthen and concrete storage. There is little steel storage availabale in the Los Angeles basin. Many of the concrete reservoirs are up-to-date, but their uses are limited. The increase in light stocks has rendered this type of storage more or less obsolete.

Wooden storage in California is very limited and has fallen almost completely into disuse for obvious reasons. It makes a poor reservoir, even in case of emergency.

The Texas Company was active in the construction of steel storage during 1929, adding 54, 118,000-barrel tanks to its extensive farm near Wilmington. This 6,372,000-barrel addition placed the company in a formidable position in the Los Angeles basin, providing better facilities for handling and marketing all kinds of products. The construction program has been completed, however.

Wilshire Oil Company and subsidiary organizations added about six million barrels of steel storage in the Los Angeles basin. This abmitious program was carried out because of the company's large production in the Santa Fe Springs field. The original plan called for a still larger program, but with Santa Fe Springs due for a steady decline, only about 60 per cent was completed.

General Petroleum Corporation built a large concrete reservoir near its new refinery at Torrance, in addition to much steel storage. This was the first reservoir of the type built for some time in the Los Angeles basin.

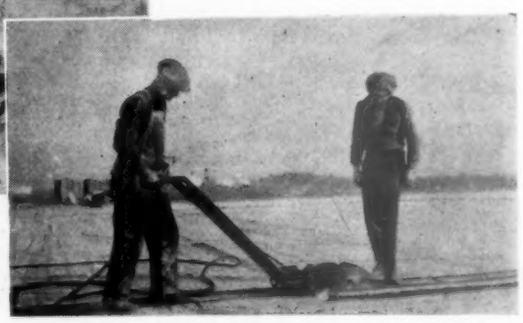
Little storage will be built during the remainder of 1930 unless the curtailment plan is abandoned and the situation becomes an "everybody for himself" affair. Even if conservation is much less effective than anticipated, purchasers and operators will be reluctant to build additional storage. The upkeep has been too high in proportion to the turnover of the stored products.

Small additions to storage facilities around the Los Angeles and San Francisco harbors have been made, because of competitive conditions and the necessity of receiving and shipping products on short notice. New loading terminals have required additional steel storage, ranging from 1000-barrel types to 80,000-barrel A. P. I. designs.

*Trimming rough boards with an air driven saw.*

*Smoothing concrete lining on the walls of an earthen oil reservoir.*

*Workmen nailing boards on an earthen storage tank with a pneumatic hammer.*



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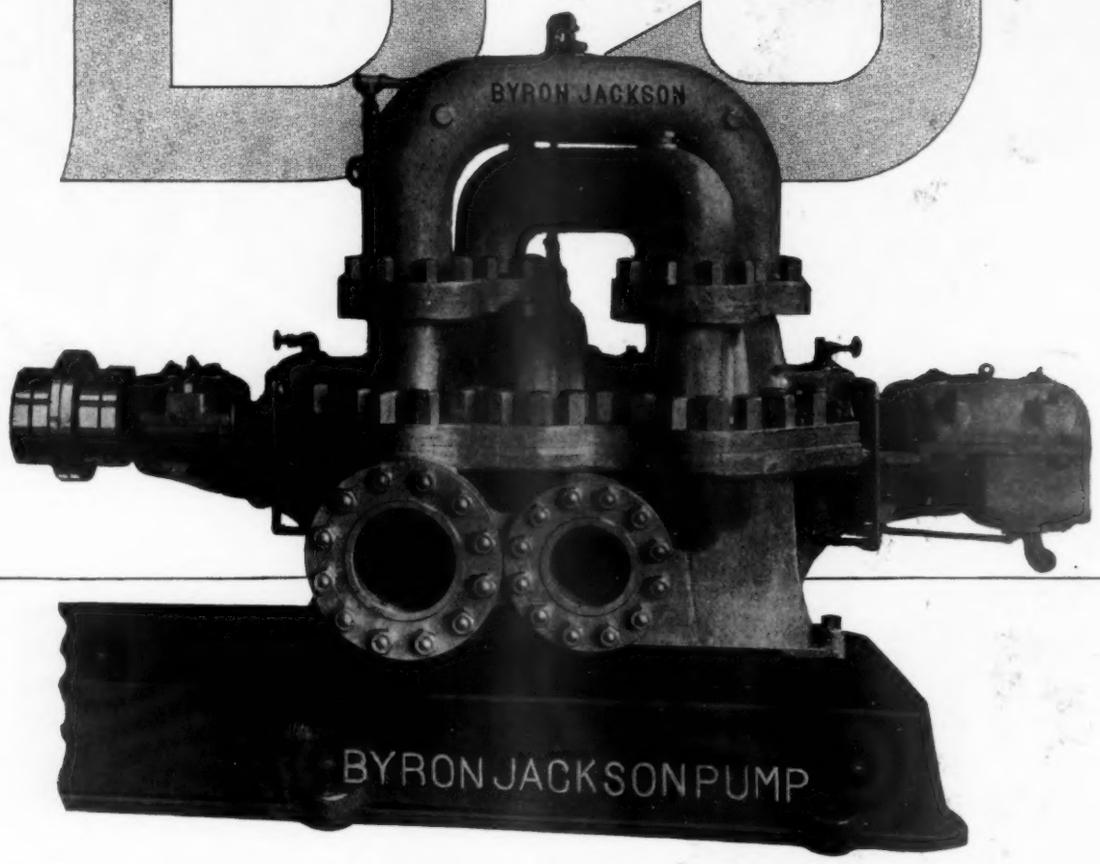


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## *In South American Fields*

# Transportation Is Largely a Matter *Of* Rolling Your Own

By ROY E. LEIGH
*Special Foreign Representative*

TRANSPORTATION is the key to South American oil. Had the geologists and wildcatters who first explored the interiors of Colombia, Venezuela, Ecuador, Peru, Bolivia, and Argentina found trunk line railroads and other facilities for the importation of materials, South America might today be producing as much oil as North America. However, instead of depending on public utilities for transportation, the oil operator who dares to penetrate the undeveloped regions of South America must provide his own means of transportation. Not only that, but he usually must blaze a trail through virgin forest or tropical swamp in order to reach his destination.

In no other way is the versatility of the foreign oil operator better illustrated than in the diversity of methods utilized by him for the transportation of machinery, equipment, and supplies. Steamships, sail-boats, river-boats, launches, barges, flat-boats, canoes, and rafts, all are made use of to penetrate the remote interior oil fields of South America. Railroads, motor trucks, horses, mules, and oxen, all bear their share of the burden of oil field equipment. The world's newest method of transportation, the aeroplane, is utilized in ordinary, routine, day-to-day operation.

The Andian National Corporation operates its own fleet of hydroplanes in maintaining communication along its pipe line right-of-way paralleling the Magdalena River in Colombia. Oil and supply men use the Scadta and Pan American hydroplane services as a matter of course in traveling to and from the oil fields of Trinidad, Venezuela, Colombia, Ecuador, and Peru, and the refineries of Curacao and Aruba, Dutch West Indies. It is now possible to fly from any part of the United States directly, or within close proximity, to all the oil camps of South America except those of Argentina and Bolivia; and aeroplane travel will materially shorten the journey to Plaza Huincul and Comodoro Rivadavia. Extensive use has been made of aeroplanes in making geological surveys and reconnaissance of inaccessible interior regions.

*Sailing vessels are extensively utilized in the transportation of materials across Maracaibo Lake*

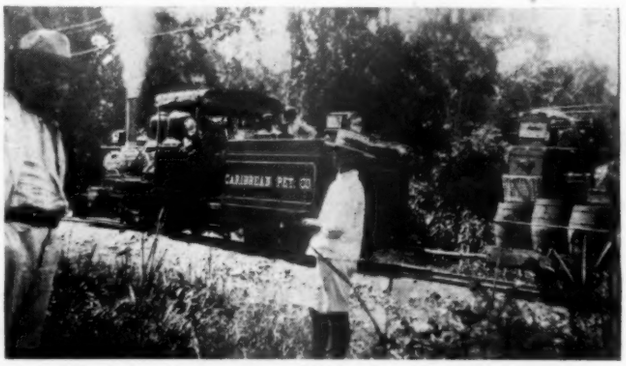
### Steamship Facilities

Oil field equipment reaches South American points by means of ocean steamers sailing from European ports, New York, Houston, and Los Angeles. A few fields are so advantageously situated near deep water that, figuratively speaking, material may almost be unloaded from the ship's deck to the derrick floor; but, in most cases, intermediate methods must be employed. Shallow-draft sea-going freighters small enough to negotiate the Maracaibo bar may unload amongst or in sight of the derricks at Cabimas and Lagun-

*Narrow gauge railroad constructed and used by British Controlled Oilfields, Ltd., for the transportation of material from Alta Gracia, a port on the eastern shore of Lake Maracaibo, inland to El Mene oil field*

illas; but material consigned in larger vessels must be trans-shipped at Curacao, about 60 miles north of the Venezuela coast, which serves as port-of-call or transfer point for all who enter and leave the Maracaibo Basin. Freight is unloaded at this point from trans-Atlantic steamers onto shuttle service steamers between Curacao and Maracaibo lake ports.

The Gulf Caribbean Steamship Line, Inc., of Houston, has recently established a regular freight service between Houston, New Orleans, and other Gulf ports and Curacao, Maracaibo, Puerto Colombio and Cartagena, which will be of inestimable value as a link between manufacturers of oil well supplies whose factories are situated in the Gulf Coast and Mid-Continent areas and oil companies operating in Venezuela and Colombia.




*Caribbean Petroleum Company early solved its transportation problem by constructing a railroad from San Lorenzo, a port on the eastern shore of Lake Maracaibo, to its Mene Grande field*

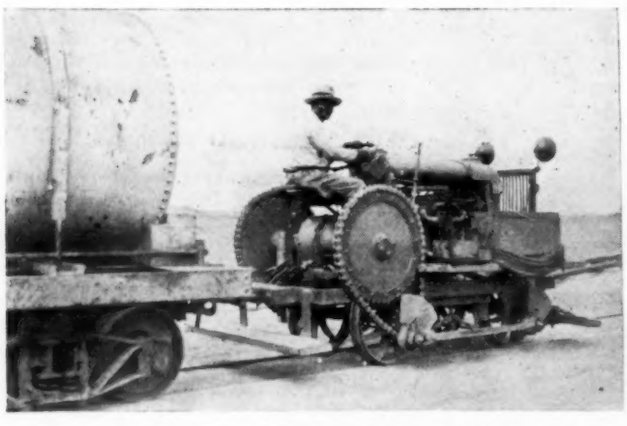
### River Traffic

Both the Tropical and Gulf Companies, operating in Colombia, ship their supplies through Cartagena, an ancient fortified port that was important during the days of the Spanish Main. Here freight is unloaded and shipped by rail to Calamar, 60 miles west on the Magdalena River, Colombia's principal artery of traffic. At this point, it is again reloaded into river-steamers of the stern-wheel type made famous by Mark Twain for the next 300-mile leg of the journey to Puerto Wilches or Barranca Bermeja. Unfortunately, the river is not navigable at all seasons of the year, as it frequently happens that traffic is suspended during the dry season, a three or four months period ending about March. Material consigned to the South American Gulf Oil Company is unloaded again at Puerto Wilches, where it is transferred to a short-line railroad, and a fourth time at Sabaneta, whence it is transported by motor truck 20 kilometers to Aguas Clares camp. The Tropical Oil Company's supplies are unloaded from river steamers at Barranca Bermeja, whence the company operates 18 miles of standard-gauge privately-owned railroad terminating at El Centro, in the Infantas field. This railroad boasts regulation equipment, passenger cars, box cars, flat cars, and steam-driven locomotives; and daily trains are operated on time-card schedule.

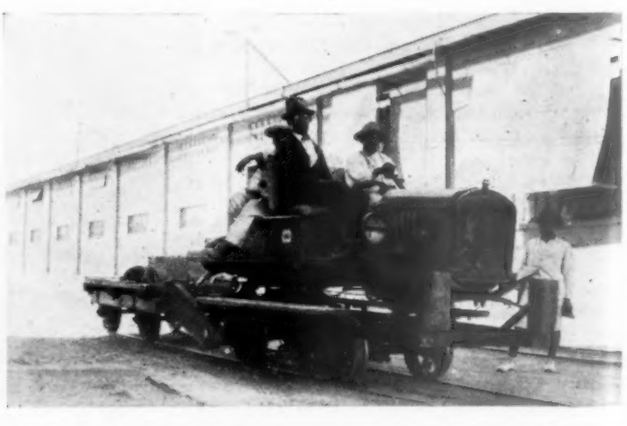
### Company-Owned Railroads

Narrow-gauge railways are also extensively utilized in South American operations. It is estimated that, upon completion of construction now in progress and plans under construction, South American oil companies will own and operate something like 1000 miles of railway lines. Railway transportation has been found to be much less expensive than motor transport, due to the lower cost of maintaining road-beds as compared to highways.

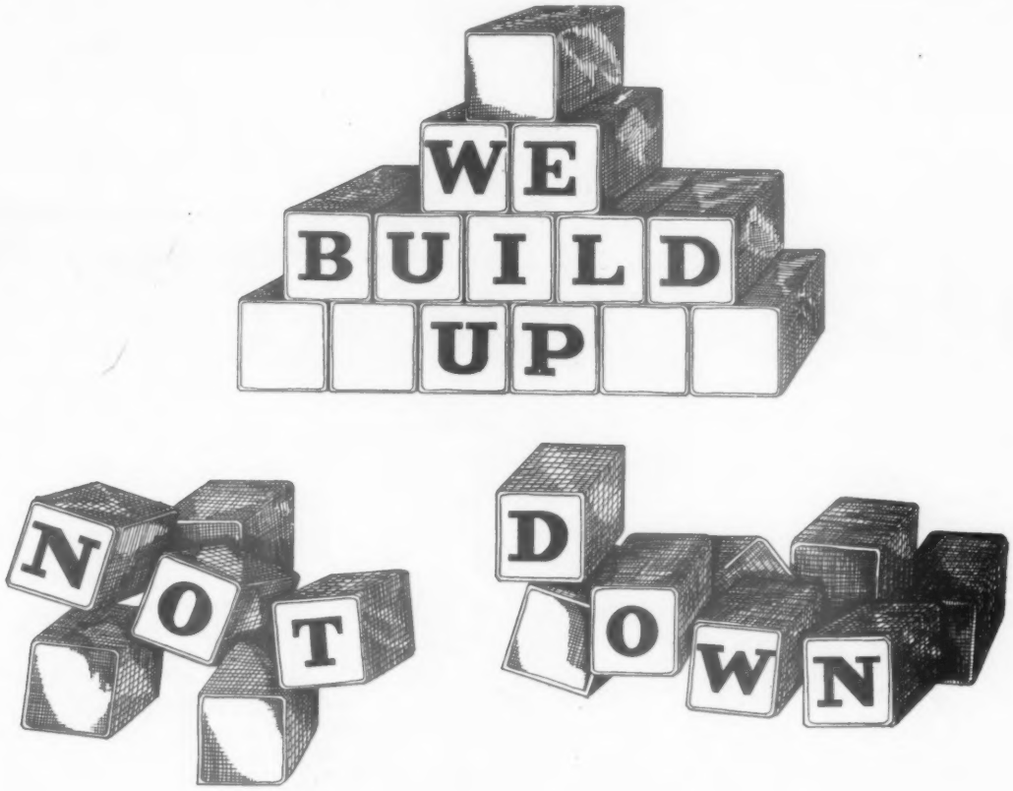
Oil companies make use of every means of conveyance. Often in the preliminary stages of their exploratory work they are forced to make use of

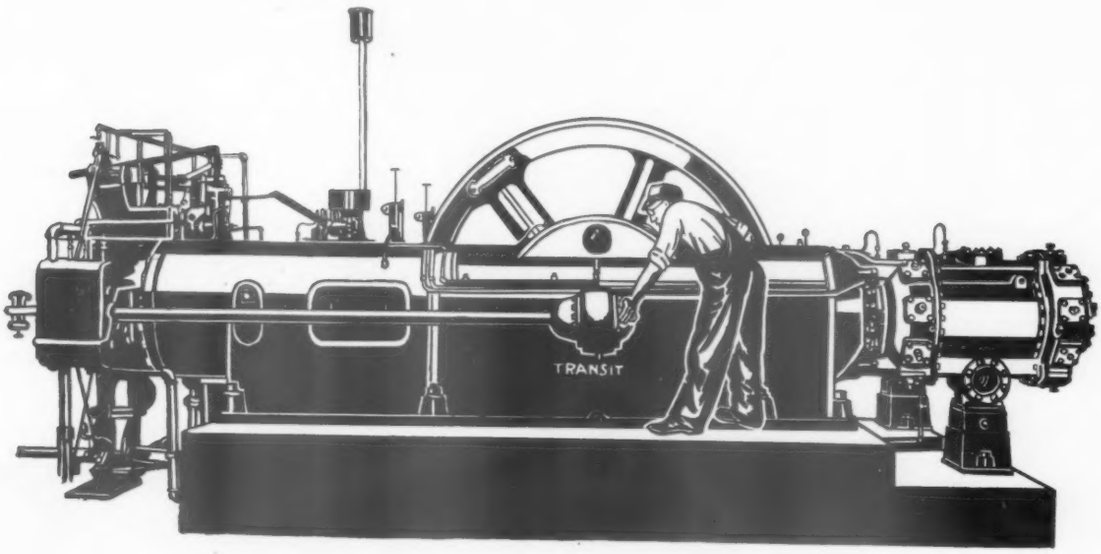


*Fordson tractor converted into a locomotive for use on the International Petroleum Company's railway in Peru*



*Model T Ford automobile converted into a locomotive for use in transporting material in the Negritos district, of Peru*

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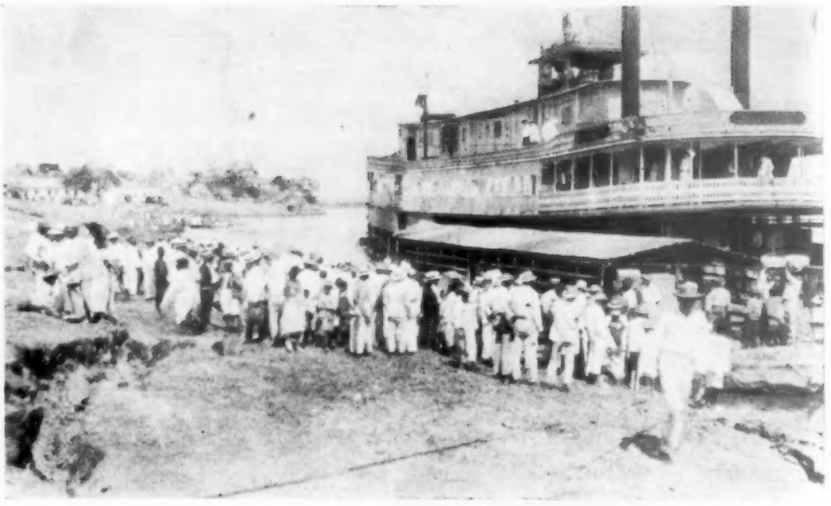
pack-animals, horses, mules, and donkeys. The first drilling tools used in the development of the Infantas field in Colombia were floated in in *cayucas* — canoes hollowed out of single logs, a popular means of conveyance among the native inhabitants. Where the tractor won't go, oxen are used,— anything to get the material to the location. Oxen are employed in stringing line pipe in Trinidad, as the rough heavily timbered terrain forbids the use of tractors or other equipment. Whatever the method employed, the oil company usually must install it, as little progress has been made in the construction of public utilities in some countries of Latin America.

British Controlled Oilfields operate 35 miles of private railway between Alta Gracia, a port on the eastern shore of Maracaibo Lake, and the El Mene field, northeast of Maracaibo. The Bolivar lake-shore fields present a regular net-work of railway lines, extending



*River steamer, Magdalena waterway, Colombia*

*Spotting a boiler at a wildcat location in Colombia*

from wharves jutting out into the lake to warehouses situated along-shore. The Lago Company has just completed 37 kilometers of 30-inch 40-pound railway line paralleling the lake shore between Cabimas and Lagunillas and connecting up all of its operations in the La Rosa, Ambrosio, Punta Benitez, and Lagunillas fields. Ten-ton gasoline-driven locomotives are used as power units, on account of the scarcity of suitable boiler-water. Venezuela Oil Concessions, a Shell subsidiary, likewise has an extensive light-railway system serving its properties in the same districts. Branch lines and spur tracks reach all of the tank farms and other points menaced by fire hazard; and special fire-fighting trains equipped with Foamite apparatus are maintained in readiness to be rushed to any point of danger.

Caribbean Petroleum Company, another Shell subsidiary, operates 17 kilometers of railway in addition to lateral lines extending from the port of San Lorenzo to the Mene Grande field. Both steam and gasoline locomotives are used on this line. Some of the steam locomotives are of German manufacture; and others are made in the United States. American manufacturers seem to have supplied all of the multiple-cylinder internal-combustion engines, the name-plates of the Milwaukee Locomotive Company, Geo. D. Whitcomb Company, and The Buda Company being prominently in evidence.

Preparations for the commercial development of the Rio Tarra, Los Manueles, and other fields controlled by the Colon Development Company (Shell) in the Colon District, southwest of Maracaibo, included the construction of narrow-gauge railway lines about 120 kilometers long. One section of this line, extending from the Rio Zulia to Las Cruces camp, will be permanent; but another section, extending from Boca Escalante on the shore of Maracaibo Lake, inland along the pipe line right-of-way, is of temporary construction, intended for use

*Ferry across Rio Palmar, Maracaibo district, built by Creole Petroleum Corporation to reach its field at Totumo*

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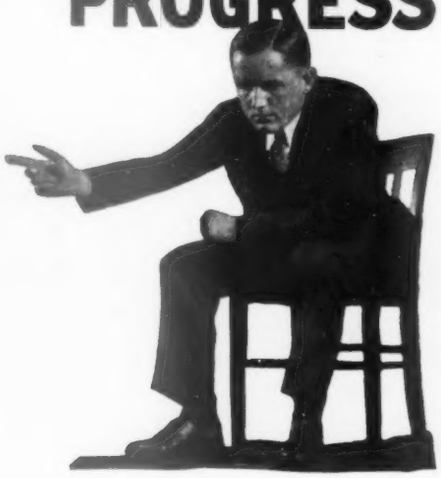
When you seem bent on spending—how are we going to save any money?"

**TRADITION**

**PROGRESS**



***"Easy, Pop—***

By spending it this way.

Even we cannot get gasoline for nothing.

These new improved Lincoln Gas Engine Driven Welders save 25% in fuel consumption.

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So you see Pop, I'm not *bent* on spending money—I'm *straight* on it this time.

***The Lincoln "Stable-Arc" Welder***

**— welds easier**
**— makes better welds**
**— permits greater output**

**because of the steady uniform arc throughout entire welding range, which is the result of:**

**Variable voltage design**
**Laminated magnetic circuit**
**Separately-excited generator field**
**Double control of welding heat**
**All steel construction**

***No other welder has all these features.***

**The Lincoln Electric Co.,**
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**"Stable-Arc" LINCOLN WELDER**

W-127

*Bridge built by South American Gulf Oil Company across a tributary of the La Brija River, Colombia*

only in stringing the new eight-inch pipe line. Material intended for the development of the new fields, from which shipments of oil are expected to be commenced about January 1, will be unloaded from ocean or lake-steamers at the mouth of the Catatumbo River, whence it will be transported up the Catatumbo and Zulia rivers on flat-bottomed barges towed by high-powered launches. The last leg of its journey will be by railway, 60 kilometers from the Zulia River to the field.

The International Petroleum Company is also in the railway business quite extensively, as it operates some 200 miles of railway line serving the Negritos district of Peru. Incoming material is unloaded at Talara, the company's office and refining center on the Pacific coast, whence it is shipped by rail to the production center, at Negritos. The company has trunk lines and laterals reaching all parts of its extensive concession, with spur tracks serving each warehouse, plant, and well.

Anglo-Ecuadorian Oilfields, Ltd., also operates a light railway system extending from La Libertad, an Ecuadorian port on the Pacific coast, across the Ancon Peninsula; and reaching every well, warehouse and plant in the Santa Elena field.

### Highways Scarce

South American oil companies have spent almost as much money on highway construction as on railways, as automotive equipment is used wherever climatic and soil conditions will permit. South American countries, as a rule, possess even fewer highways than railways; and the oil companies are forced to lay out and build their own roads before commencing the development of their properties.

In Trinidad, for example, where the soil is damp and spongy, it is necessary to build roadways leading directly to each location before drilling can be commenced; there is no striking out across country, as may be done in Texas, Oklahoma, and New Mexico. Fortunately, however, the Colony possesses abundant supplies of asphalt and porcellanite, a natural burned clay mined in the vicinity of Pitch Lake and extensively used in connection with corduroy for the construction of oil-field roads; so that road construction is not so expensive as it might otherwise be. One of the companies, on whose property a number of outcrops of oil sand occur, uses the sandy, bituminous residue remaining from the evaporation of the volatile fractions of the oil for the surfacing of roads throughout its properties.

Highways and automotive transportation are used in reaching the La Paz and Concepcion fields and other wildcat operations on the western shore of Maracaibo Lake. Motor trucks are used in this service only during the dry season, as caterpillar tractors must be resorted to during the rainy season. Sand conditions are so bad in certain parts of the Maracaibo districts that automobile engine blocks often have to be renewed after 2500 to 5000 miles. When motor trucks are used, transportation costs average around 55 to 60 cents per ton-mile, during good weather; but, when tractors are necessary, the sky is the limit.

The International Petroleum Company operates more than 400 units of automotive equipment in connection with its production and refining operations at Negritos and Talara, Peru. The Standard Oil Companies of Argentina and Bolivia are extensive users of automobiles and trucks, as all of the material required for their operations in the new fields of northern Argentina and southern Bolivia must be transported by motor from the rail-head at Tartagal, Argentina, into the interior of Bolivia. For this purpose, the company has constructed more than 500 miles of highway, leading from Pastor Senillosa, Argentina, to Santa Cruz, Bolivia. Some of the equipment used in these operations is worth almost its weight in gold before it reaches its destination.

Photo by C. C. McDermond

*Bulls served in lieu of locomotives in the early days of the Rio Tarra field*

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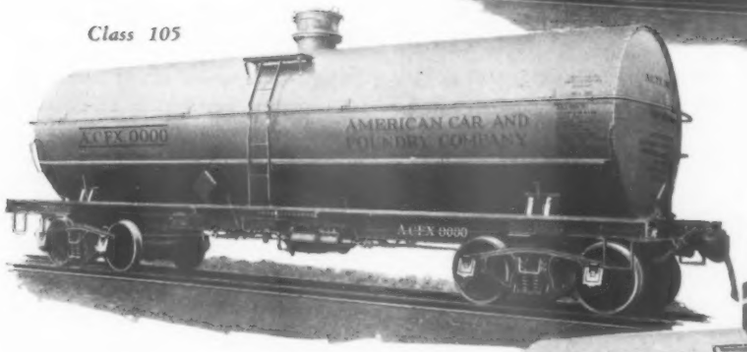


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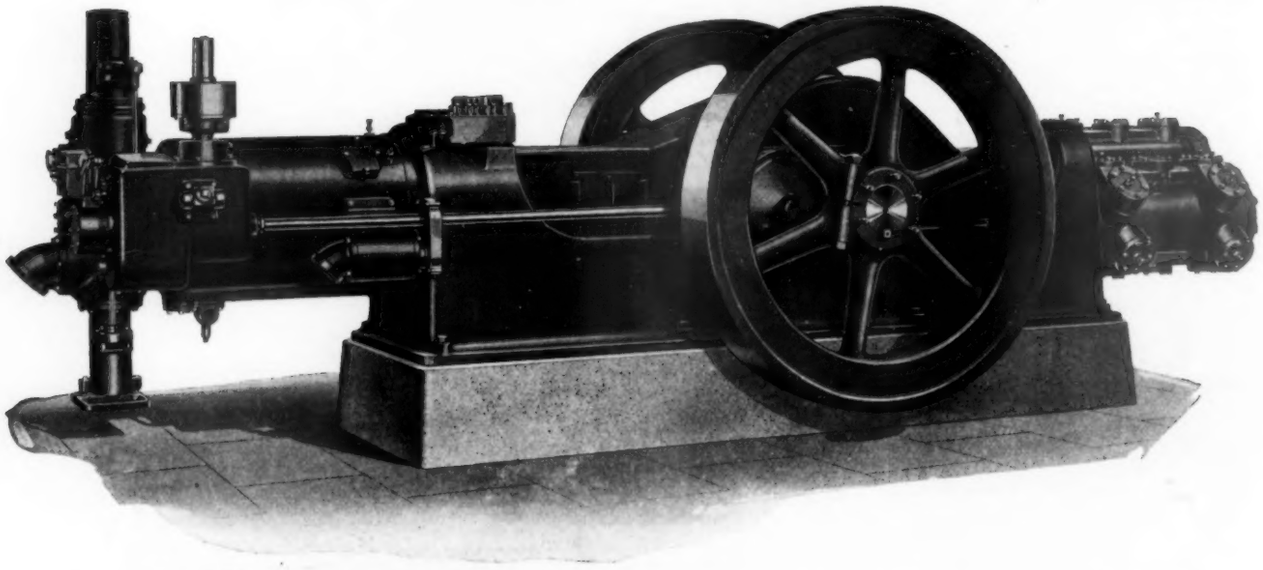

THIS new 100 H. P. Direct Driven Compressor carries an Auxiliary Exhaust Valve that practically eliminates all valve trouble. It embodies features that stamp it as a unit far in advance of any heretofore offered, and it will carry the full rated horse power load.

It is a four cycle, single acting, center crank type, fully enclosed, with two fly wheels and has the following features—

## *Auxiliary Exhaust Valve*

The main feature of our new engine is an Auxiliary Exhaust Port Sleeve Valve, (Patent applied for). It eliminates valve trouble. As practically all fire is taken out of cylinder through the center of this sleeve valve, and does not come in contact with the finished surface of the main valves, the greatest wear is eliminated. After exhaust takes place, this valve closes, and prevents loss of incoming charge or fouling by exhaust gases. No fire goes through the main valves.

## *Assembly of Compressor Cylinders*

Each cylinder is independent of the other. The pistons or valves can be removed without changing a single pipe connection or affecting the alignment in any way.

This 100 H.P. Direct Driven Compressor is self contained—one foundation, and has no outboard bearing or supports of any kind to get out of line and cause trouble.

It has high speed governor, gear driven, Timken Bearings, with wedge adjustment, completely enclosed combination splash and force feed lubrication, and automatic air starter.

A special feature has been built into this unit, which permits it to operate on very lean air gas.

It is destined to be the sensation of 1929—write today for literature on this Super Power Unit.

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Meister Valves are made of vanadium steel and weigh less than two ounces each. On account of their lightness they are absolutely noiseless and will never require grinding.

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2—Elimination of lubrication of any kind for the valve itself.
3—Silent operation at the highest piston speeds.
4—Valves never require regrinding.
5—Elimination of troublesome springs.
6—Simplification of air end, owing to the absence of all complicated valve operating mechanism.

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# A Diaphragm or "Breather" Roof for Oil-Storage Tanks[1]

By LUDWIG SCHMIDT[2]

THE economic value of reducing the evaporation losses of crude oil and of gasoline is so well founded that the petroleum industry is constantly seeking new and improved storage tanks and methods of handling its products to further reduce these losses. A comparison of the methods and apparatus used in handling and storing crude oil and its products today with those in general use 10 years ago would show that an oil tank is no longer simply a container for holding liquid, but is now considered an important piece of equipment which is subjected to constant inspection and care. In fact, the modern vapor-tight tank often requires as much care as a boiler or pump when one considers its various component parts such as vapor-tight gage hatches and thief-hole covers, vacuum and pressure relief valves, swing line apparatus, vapor-recovery systems, insulation, cooling devices, and often automatic gaging devices. As an auxiliary to the physical equipment of the tank itself the subject of paints and paint colors is now given considerable attention.

In addition to vapor-tight tanks and auxiliary equipment, other types of tanks for reducing evaporation which are new to the industry have also been developed and placed on the market within the past few years. The development of the floating roof type was an innovation in tank construction, directed toward the reducing of evaporation losses. This type of roof rides on the surface of the oil and thus eliminates all vapor space. It is especially valuable in working tanks.[3] A recent development in tank construction is a new type of tank roof known as the diaphragm or "breather roof," which practically eliminates the movement of air-vapor mixture from a storage tank filled with oil. It is of especial value for use on tanks in which oil is stored over long periods.

[1]This paper represents work done under a cooperative agreement between the United States Bureau of Mines and the State of Oklahoma. Reprinted from United States Bureau of Mines reports of Investigations 2984.

[2]Petroleum Engineering, United States Bureau of Mines.

[3]Schmidt, Ludwig, A. Floating Roof for Oil Tanks. Reports of Investigations 2547, Bureau of Mines, 1923.

[4]Schmidt, Ludwig, Effect of Cooling Systems on Evaporation Losses of Gasoline. Report of Investigations 2531, Bureau of Mines, 1923.

[5]Schmidt, Ludwig, Effect of Tank Colors on Evaporation Losses of Crude Oil. Report of Investigations 2766, Bureau of Mines, 1925.

[6]Schmidt, Ludwig, Reduction of Breathing Losses from Vaptor-Tight Lease Tanks. Report of Investigations 2834, Bureau of Mines, 1927.

**Acknowledgments**

This investigation was conducted under the direction of the United States Bureau of mines in co-operation with the State of Oklahoma.

Indian Territory Illuminating Oil Company furnished the oil and tank for the field tests.

N. A. C. Smith, superintendent, and Ben E. Lindsly, senior petroleum engineer of the Bartlesville station of the Bureau of Mines, made suggestions and criticisms which were of much value in the preparation of the report. John M. Devine, assistant organic chemist, and Peter Grandone, assistant chemist, aided in collecting the field data and made the distillation and gravity determinations. The drawings were prepared by John Trevorrow and J. M. Seward of the Bartlesville station.

## Scope of Report

The Bureau of Mines, in continuing its work on the prevention of evaporation of crude oil and gasoline, has recently completed tests on an 80,000-barrel storage tank equipped with a breather roof in the Seminole area. This report includes the results of this test, as well as the results of a test on an experimental tank located at the Petroleum Experiment Station, Bartlesville, Oklahoma.

Although the bureau believes that the oil industry as a whole is concerned mainly with the results of the tests, it is advantageous to describe, in considerable detail, the design and operation of this roof.

## Evaporation Losses From Storage Tanks

The factors which influence the rate of evaporation of a given liquid are: Temperature of the surface of the liquid, quantity of vapor in the atmosphere in contact with the liquid, area of evaporating surface, and renewal of air over evaporating surface. Assuming that other conditions are equal, the amount of evaporation of crude oil in storage tanks will be most greatly influenced by two factors, the first of which is the vapor pressure of the liquid; this governs the amount of gasoline vapor in the vapor-air mixture above the oil surface at a given temperature. The second factor is the "breathing" of the tank, which is the expulsion of vapor-air mixture from the tank during certain periods of the day and the inflow of air from the atmosphere at other times. This breathing is caused principally by atmospheric variations, although there are other factors, such as diffusion, which have some influence on the movement of air or air-vapor mixtures from storage tanks. Generally, the effect of atmospheric variations on the oil surface and vapor-air temperatures is the greatest factor in causing a vapor tight tank to breathe. Therefore, a vapor-tight cone or dome roof is breathing more or less constantly.

Breathing of storage tanks is greatly reduced by the use of water sprays, insulation, and other cooling devices,[4] of light colored paints[5] and by use of vacuum and pressure relief valves in various combinations of the above methods.[6]

Even with many of these improvements the breathing losses from large storage tanks containing highly volatile crude oil or gasoline are of sufficient value to warrant additional expenditures to reduce these losses still further. This is shown by the following data, which were furnished the writer through the courtesy of one of the oil companies operating in the Seminole area. The average loss for a period of six months from four 55,000-barrel all steel tanks with welded roofs and low-pressure vent valves was 0.7 per cent of the total volume stored. This represents a loss of about 364 barrels per tank for the period, or about 700 barrels per year.

## The Diaphragm or Breather Roof

The breather roof is an all-steel welded or riveted roof which slopes downward from its outside circumference toward the center for a short distance and then is level to the center. It forms an inverted frustum of a cone with an altitude of about eight inches. In an 80,000-barrel tank (117 feet in diameter) this roof slopes downward from the outside circumference for about 20 feet toward the center and then is practically level to the center. As the roof is attached to the tank around the top angle only, it is in reality a large diaphragm which upon expanding assumes a dome shape. The amount of rise at the center is 24 to 26 inches in a tank 117 feet in diameter. In smaller tanks the rise is less, for example, in a tank 60 feet in diameter the breather will rise about 20 inches at the center.

Since the actual altitude of the inverted frustum of the cone is only eight inches in an 80,000-barrel tank when the roof plates are resting upon the rafters, it is desirable during construction to provide excess metal in the roof so that its maximum expansion at the center will be 24 inches instead of 16 inches before the roof plates are under tension. This excess

# *When* YELLOW GOLD

## *. . . . the* PROSPECTOR'S KIT OF TOOLS *changed to*

# *Changed to* BLACK *in* CALIFORNIA

## *a* GUIBERSON CATALOG

# GUIBERSON

BETTER BE SAFE THAN SORRY

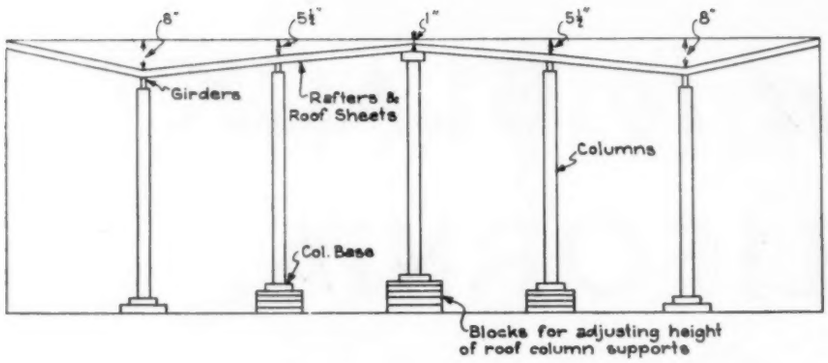


Figure 1 - Position of roof columns and rafters while deck sheets are laid and welded

metal is provided by blocking up the center post eight inches during construction so that the rafters at the center of this tank are about one inch below the top angle iron. The second ring of posts is blocked up so that the tops of the rafters at the points directly above these posts are about 5½ inches below the top angles. The outside group of posts or columns which are 20 feet from the shell are maintained at their normal height during construction; that is, the tops of the rafters are about eight inches below the top angle. The heights of the rafters during construction are shown in Figure 1. The roof plates are then laid on the rafters and welded or riveted to each other as well as to the tank at the top angle. After the roof is completed the extra blocks from beneath the center column and middle group are removed, and the roof and framing are lowered to their normal position, as shown in Figure 2. If necessary the rafters slip slightly at the bolt holes where they connect to the girders. This method of construction permits a rise of 24 inches at the center in a tank 117 feet in diameter before the plates get taut. The volumetric expansion is between 11,000 and 12,000 cubic feet. In this type of roof the rafters are fastened to the girders and the roof sheets are attached to the tank only around the top angle iron.

The value of this roof in reducing evaporation losses is shown by comparing it with a tank equipped with a standard conical roof with a pitch of one-half-inch per foot. In an 80,000-barrel tank (117 feet in diameter) equipped with a conical roof and filled with crude oil to within eight inches of the top, the vapor space above the surface of the crude in the tank would be about 11,600 cubic feet. Assuming a temperature variation of 40° F. during a 24-hour period, the increase of volume due to temperature alone would be about 900 cubic feet, which means that during the period of rising temperature 900 cubic feet of gasoline-laden vapor would be forced from the tank to the atmosphere, and a like amount of fresh unsaturated air would be drawn into the tank during the period of falling temperature. It must be remembered that the breathing of a tank is not alone due to variation of the temperature of the vapor space, but also is caused by variation in atmospheric conditions such as barometric pressure, variation in wind velocities as well as changes in vapor pressures of the liquid surface, and variation in the volume of the liquid due to changes in temperature. These combined effects would greatly increase the amount of the "breathing of the tank" over that calculated solely from the temperature changes of the vapor space.

Under the same conditions an 80,000-barrel tank (117 feet diameter) equipped with a breather roof and filled to within eight inches of the top so that the roof just rested on the surface of the oil, would have a vapor space above the crude of about 2800 cubic feet. Assuming an increase in temperature of 40° F. during the 24-hour period the increase of volume due to temperature alone would be about 224 cubic feet. Since the expansion of the roof allows for a total vapor space of 12,000 cubic feet above the oil surface it is evident that there is more than enough additional space available to take care of all breathing due to the temperature variation in the vapor space, as well as breathing caused by the change in the vapor pressure of the average crude oil. For example, assuming the vapor pressure of a given crude to be 3.8 inches of mercury at 70° F. and 6.5 inches of mercury at 110° F., then the increase of volume of the tank vapors due to increase in vapor pressure above would be about 9.2 per cent.

This type of roof is equipped with a direct-action mechanical volume-control valve, as shown in Figure 3. The valve is positive acting and is operated by a rod which engages the roof framing when the roof has risen to a predetermined height. The gas pressure inside of the tank is equal to the weight of the roof, but the operation of this valve is dependent upon volume increase instead of an appreciable increase of gas pressure. The engaging of the rod with the roof frame causes the valve to open and release the vapor when the roof has reached an expansion of about 24 inches. The valve is mounted on a manhole cover in the center of the roof. As a general rule this valve only has to function when the tank is being filled or is only partly filled.

In addition to the volume-control valve, the roof is equipped with a vacuum relief valve, as shown in Figure 4. This valve is of the liquid-seal type. Glycerine is used for the liquid seal. The operating pressures of the valve are five inches of water for pressure and 1¼ inches of water for vacuum. This valve has a circular sealing trough. When the valve operates under vacuum, the sealing liquid is lifted into the large main reservoir, thus breaking the seal. When the differential pressure is reduced to one-half-inch of water, the liquid flows from the reservoir to the sealing trough and seals the valve.

Since the roof is made of 3/16-inch plate, its weight is 7.65 pounds per square foot, or 0.85 ounces per square inch. Therefore the pressure in the vapor space can not greatly exceed .85 ounces pressure per square inch until the roof is fully expanded. When fully expanded, the volume control valve opens and relieves the excess vapors before appreciable tensions develop in the roof plates. This eliminates the possibility of rupturing the roof.

### Tests on Breather Roofs

*Test No.* 1. The first tests of a diaphragm roof were made on a tank 29 feet and six inches in diameter and five feet two inches high. As this tank was installed purely for experimental purposes, the roof was pitched down so that its center was one foot below the top of the

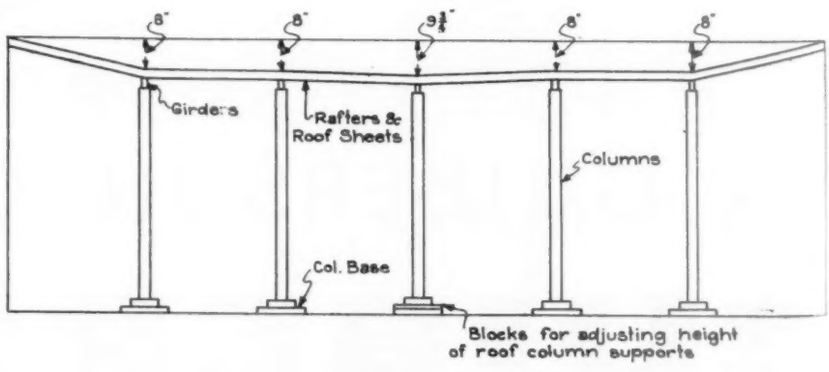


Figure 2 - Completed breather roof in its deflated or normal position

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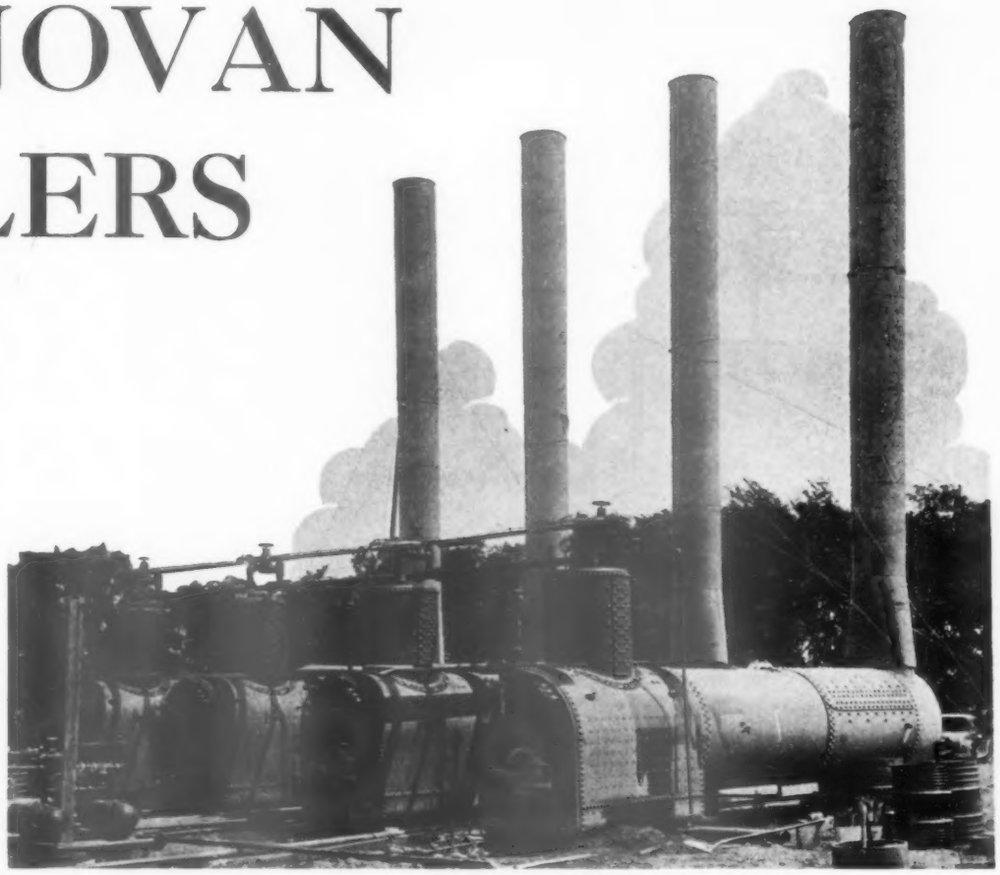

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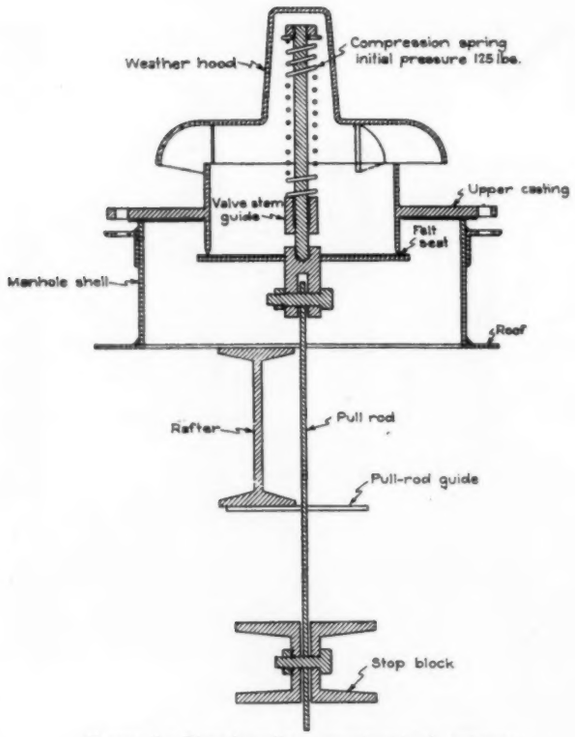



Figure 3 - Direct-acting mechanical volume-control valve used with breather roof

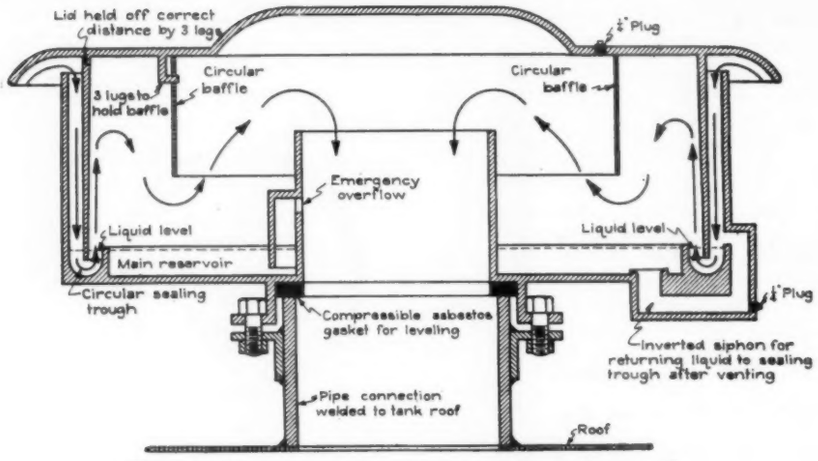



Figure 4 - Vacuum-relief valve used with breather roof

shell which was an excessive pitch for such a small diameter. The roof and tank was of all-steel welded construction and was equipped with the necessary vacuum and volume relief valves. The tank was unpainted.

The test was divided into two parts: the first was to determine the practicability of the type of construction from a mechanical standpoint, and the second was to determine the value of the roof in reducing evaporation losses.

In discussing the first part of the test it should be realized that the total expansion of this roof was 24 inches and its diameter was 29 feet six inches. When this roof is compared with an actual installation on a tank 117 feet in diameter with a total expansion of 24 inches at the center it will be seen that the experimental tank had a total flexture at the top angle of the shell four times as great as the commercial installation on an 80,000-barrel storage tank. The mechanical test of the roof consisted in expanding and contracting it the full amount 293 times. After this test the roof seams were carefully examined for leaks and other evidences of failure. There was no evidence of break in the roof.

The second part of the test consisted of filling the tank to three feet 11 inches with water on top of which was floated 106 gallons of gasoline. This gave the tank a total outage of 14 inches or about two inches below the lowest point of the roof when it was deflated. The gasoline level was determined by a look box equipped with needle-point measuring devices attached to the side of the tank. This permitted a direct reading of the gasoline in the tank. The temperatures of the vapor space were determined by recording thermometers, and the temperatures of the liquid were taken with ordinary mercury-filled thermometers placed in thermometer wells located at different points in the tank. The evaporation test started May 7, 1927, and ended March 10, 1928—a period of 10 months. The gasoline used had a gravity of 60.2° A. P. I., 10 per cent of which distilled over at 124° F., 50 per cent at 261° F. and the end point was 438° F.

Although the test period covered the hottest period of the year, there was no evaporation loss that could be measured with scales reading to one-hundredth of an inch. The maximum temperature of the vapor space during the test period was 152°F. During the months of July and August, 1927, the average daily maximum temperature of the vapor space was 132°F. and the average minimum temperature was 76.5°F. This gave an average daily temperature variation of 55.5°F. At no time during the test period was the roof fully expanded.

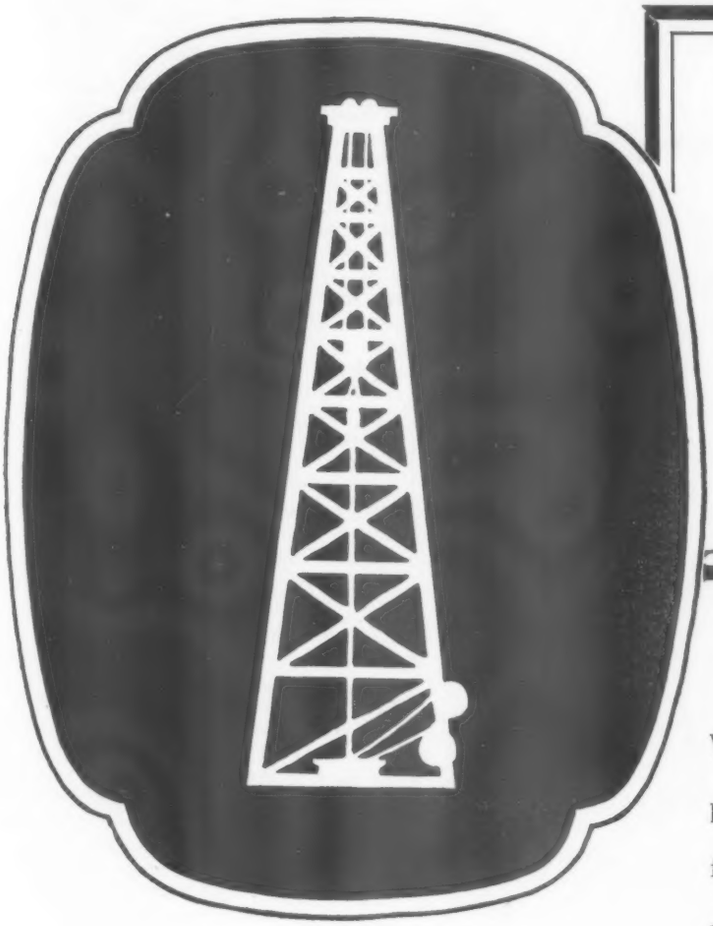
To prove that the expansion feature of the roof on the test tank accommodated the change in volume of the tank vapors, the tank was completely sealed by removing the vacuum-relief and volume-control valves and plugging all openings. The tank then was equipped with a recording pressure gage and allowed to stand for several months. At no time during this test period did the recorded pressure show that the roof had been fully expanded. This proved that the expansion or contraction of the vapors in the tank were compensated by the flexibility of the diaphragm type of roof.

After a six months' test the tank was closely inspected for leaks in the roof. No leaks were found.

*Test No. 2.* Test No. 2 was made on an 80,000-barrel tank located in the Bowlegs field and filled with Seminole crude having an average gravity of 40.9° A. P. I. The tank was 117 feet in diameter and was equipped with a breather roof. Additional equipment consisted of a volume-control valve (Figure 3), two vacuum relief valves (Figure 4), and a gage hatch (Figure 5). The gage hatch is of the liquid-seal type having a liquid depth of about seven inches. The depth of liquid space allows the use of crude oil as the sealing medium if desired, and gives sufficient liquid head to prevent the gage hatch from becoming a pressure or vacuum relief valve. Space A in Figure 5 is an extra reservoir for the hatch cover when removed for gaging. This prevents the oil from dripping on the tank roof.

On September 19, or about three months after the evaporation test was started, the tank roof was painted with aluminum; previously the tank was unpainted.

The test was started on June 6, 1927, and ended June 28, 1928. Volumetric gages and samples of the crude oil were taken every month. Bottom leaks, were found in the tank after the test started



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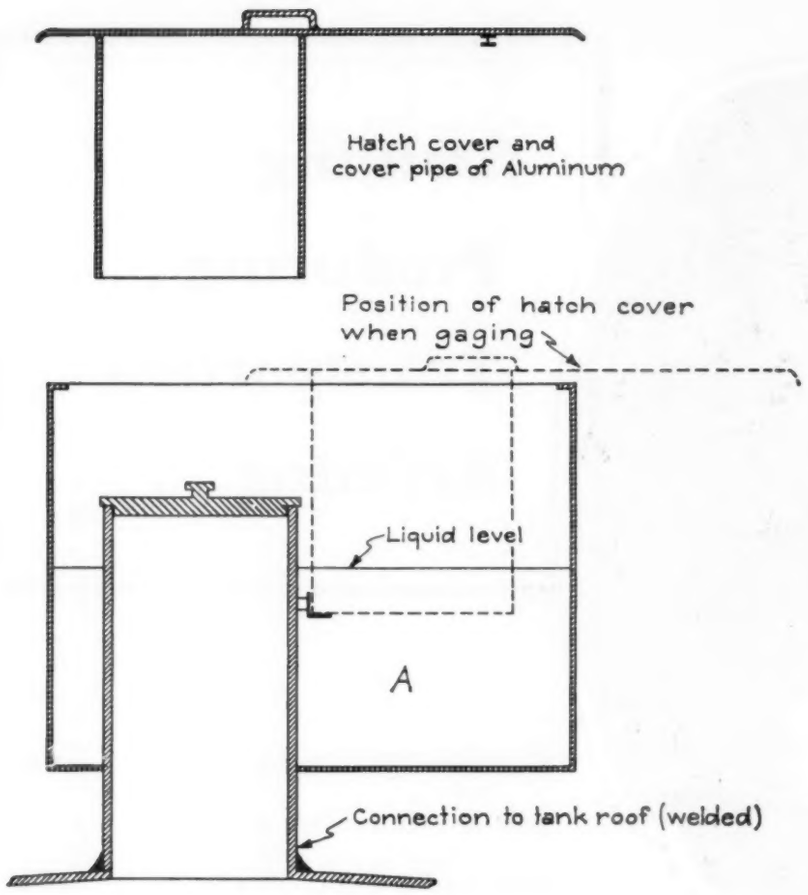


Figure 5- Liquid-seal gage and thief hatch

and several of the smaller leaks were repaired. After several months of trial and effort, however, it was finally found necessary in July, 1928, to empty the tank and to make the needed repairs. For this reason the evaporation data obtained in this test consist only of specific gravity determinations and distillation analysis of the crude petroleum.

Figure 6 shows the gravities of the monthly samples obtained during this test. It will be noted that during the first few months of the test period the gravities of the crude petroleum are erratic. This may have been due in part to the difficulty encountered in obtaining a true average sample from a large storage tank and in part to the settling out of the impurities in the oil such as water and small amounts of b.s. A study of the gravities obtained show that there is very little change in the average gravity of the first three months and the last three months of the test period. In fact, the averages are within the limits of experimental error. This indicates the evaporation losses during the test period were practically negligible.

Table 1 shows the distillation analysis of samples of the crude oil obtained from the test tank.

The distillation data in Table 1 also show somewhat erratic results, due no doubt to the difficulty in obtaining samples as well as to experimental error in making the analysis. Unlike the gravity determinations, however, the distillations show a slight loss of the stored crude. This is to be expected, for although Test No. 1 showed no loss with gasoline in storage, test tank No. 1 was never opened from the beginning until the end of the test. On the other hand the 80,000-barrel tank was the first commercial tank to be equipped with a breather roof, and it was often inspected by interested parties. In order to demonstrate the working of the tank it was sometimes opened during the hot period of the day when the roof was inflated, which allowed the escape of the tank vapors to the atmosphere. Each time the roof was deflated there was a vapor loss which in fluid equivalent varied from one to six barrels, depending on how much the roof had expanded. For best results a tank equipped with the breather roof should be opened for gaging only, and then only in the early morning when the tank temperatures are low and the roof is resting on the rafters. This will greatly reduce the escape of the tank vapors to the atmosphere. A gage well can be installed so that during gaging at any time of the day no vapors will escape.

### Corrosion

In many districts, corrosion of the under side of storage-tank roofs has been particularly active, especially in several of the West Texas fields producing high-sulphur crude oils. Several of the companies, however, have materially reduced their corrosion troubles by the use of breather roofs. With this type of construction the tank is filled until the entire roof rests upon the surface of the oil, thus elminating the vapor space. Under these conditions the tank is filled until the actual oil level is from one to two inches above the top angle. A vent on the tank roof is then opened by hand to allow the tank vapors to escape into the atmosphere and permit the roof to settle down on the surface of the oil. Since oil expands when its temperature is increased, it is necessary to provide an overflow line to pre-

(Continued on page 210)

**TABLE 1**

**Distillation analysis of samples of crude petroleum obtained from 80,000-barrel tank equipped with a breather roof**

| Date | June, 1927 | | September, 1927 | | March, 1928 | | June, 1928 | |
|---|---|---|---|---|---|---|---|---|
| Gravity of crude °A.P.I. | —40.9— | | —40.8— | | —40.8— | | —40.8— | |
| Per cent Cut | Temp. °F | Gravity °A.P.I. | Temp. °F | Gravity °A.P.I. | Temp. °F | Gravity °A.P.I. | Temp. °F | Gravity °A.P.I. |
| F.D. | 75 | .... | 77 | .... | 78 | .... | 80 | .... |
| 1 | 82 | 93.1 | 81 | 93.2 | 84 | 93.0 | 88 | 92.6 |
| 2 | 91 | 94.9 | 88 | 94.6 | 92 | 94.5 | 95 | 94.3 |
| 3 | 99 | 94.5 | 95 | 94.4 | 102 | 94.0 | 104 | 93.9 |
| 4 | 109 | 93.5 | 106 | 93.5 | 118 | 92.8 | 113 | 92.4 |
| 5 | 124 | 90.6 | 117 | 91.3 | 129 | 89.9 | 120 | 89.7 |
| 6 | 131 | 87.2 | 133 | 87.9 | 135 | 87.0 | 139 | 87.2 |
| 7 | 140 | 83.6 | 144 | 83.6 | 151 | 82.3 | 148 | 82.9 |
| 8 | 151 | 80.0 | 154 | 79.4 | 160 | 76.6 | 157 | 79.7 |
| 9 | 160 | 76.0 | 167 | 75.4 | 172 | 75.7 | 163 | 76.0 |
| 10 | 180 | 72.1 | 178 | 71.8 | 181 | 70.6 | 184 | 71.4 |
| 12 | 194 | 68.1 | 192 | 68.1 | 194 | 67.5 | 192 | 68.1 |
| 14 | 205 | 65.3 | 203 | 65.9 | 205 | 65.0 | 203 | 65.0 |
| 16 | 216 | 63.4 | 214 | 63.9 | 217 | 62.9 | 219 | 63.1 |
| 18 | 228 | 62.1 | 230 | 62.0 | 232 | 61.7 | 233 | 61.6 |
| 20 | 243 | 60.8 | 243 | 61.2 | 246 | 59.7 | 247 | 60.2 |
| 25 | 282 | 57.9 | 279 | 57.6 | 280 | 57.2 | 280 | 57.6 |
| 30 | 316 | 53.5 | 302 | 53.3 | 316 | 53.0 | 311 | 53.1 |
| 40 | 403 | 48.3 | 401 | 48.7 | 401 | 48.0 | 396 | 48.1 |
| 50 | 487 | 41.3 | 487 | 41.5 | 484 | 41.1 | 487 | 41.3 |

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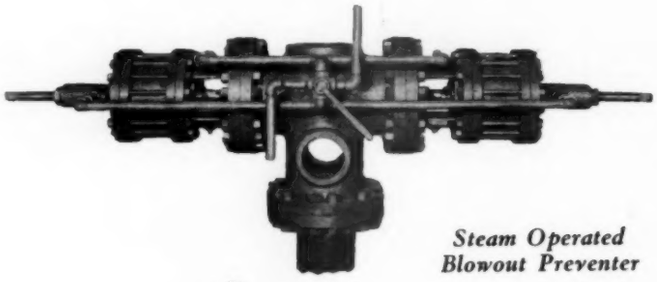
That an ounce of prevention is worth a pound of cure holds good even for the oil industry. Precaution in the form of C-I-W Blowout Preventers and Tubing Control Heads are a preventive against the destructiveness of high pressures and the resultant loss of thousands of dollars.

Employing the famous and unchallenged grip of steel against steel these three high pressure products have saved the industry hundreds of thousands of dollars in the loss of equipment and oil. When their concave steel rams grip the tubing, casing or drill stem no pressure yet encountered in drilling has been sufficiently strong to cause them to leak or give way.

Our steam operated preventer is the greatest achievement of the century for preventing blowouts. Its use provides instantaneous closing, positive grip, remote control and absolute control of the well during all phases of drilling.

The manually operated preventer employs the same gripping principle except that it is closed by 48 inch diameter wheels extended away from the derrick floor and connected to the ram screws by universal joints which give a wide latitude of angles for closing the preventer.

The tubing control heads are made in two sizes; heavy duty, tested to 6000 pounds and designed for use on wells developing pressures over 500 pounds; regular type, tested to 1200 pounds and designed for use on wells developing pressures under 500 pounds. Ratchet levers assure instantaneous closing of the steel rams while locking screws are provided for more permanently locking the tubing in the well. These heads make it possible to run tubing under pressure, change the size of tubing, run graduated strings of tubing, wash the well thru the tubing or successfully complete any other such job without killing the flow.



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The working principle of these three products is the same; i.e. concave steel rams packed with a special hydraulic packing that is designed to become tighter as the pressure increases close around the pipe in the well. In addition to this these rams are machined on top and bottom thus providing a flat surface against which couplings or tool joints may butt and thru which they can not pass.

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# Technical and Mechanical Progress

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# First California Engineering Exposition

LOS ANGELES.—Governor C. C. Young of California will attend the formal opening of the Oil Equipment and Engineering Exposition at Los Angeles on March 17 if his official duties will permit. He will be supported on the platform by officials of the leading civic and business organizations of the state, as well as by the directors of the exposition.

At least two technical sessions are expected to be held each day, one at ten o'clock and the other at two o'clock, with the possibility of evening sessions if any desire for them is shown by field men attending the exposition.

Practical subjects related to present-day field problems will be selected for discussion at these technical sessions, which will be sponsored by local chapters of national engineering societies.

Wendell Jones is chairman of the program committee, which also includes W. H. Laury, Universal Rod and Equipment Co.; Frank Mason, Shaffer Tool Works; Harry Morgan, Blackor Co.; R. R. Robinson, consulting engineer; W. E. Green, Refiner and Natural Gasoline Manufacturer; Brad Mills, Oil Weekly, and H. W. Westsmith, publicity director. This committee will have the assistance of the local officers of the American Petroleum Institute production division, and of other engineering organizations.

Members of the Southern California section of the American Society of Steel Treaters are expected to hold a joint session with the American Welding Society on Tuesday morning at ten o'clock. The projected program will consist of specially prepared papers reviewing recent developments in the heat treatment of oil-field tools, and is expected to require an afternoon session.

Although no definite arrangement have been made, Wednesday is scheduled for meetings of the American Institute of Mining and Metallurgical Engineers, the American Society of Mechanical Engineers, and the Purchasing Agents Association of Los Angeles.

W. H. Jackson is president of the local Purchasing Agents and oil men form an important section of the organization, which wil hold its own Informa-Show on March 13. National officers present at the meeting are expected to attend the exposition.

Engineers of the U. S. Bureau of Mines production division will bring from Bartlesville, Oklahoma, part of the exhibit that attracted so much attention at the last Tulsa exhibition. C. P. Bowie, supervising engineer of the Bureau, with headquarters in San Francisco, will add material gathered by his assistants from California fields.

S. H. Ash, district engineer of the Bureau, will supervise an exhibition of equipment used in oil-industry safety work. He will be assisted by Emory Smith, foreman of the Bureau's rescue motor truck, and will have the cooperation of safety engineers attached to the engineering departments of the leading oil and gas companies of California. Practical demonstrations of the use of gas masks will be given, and instruction will be offered in first-aid training.

*ON the following pages will be found descriptions and illustrations of the new and improved equipment displayed at the Oil Equipment and Engineering Exposition in Los Angeles. It is the purpose of* THE OIL WEEKLY *in presenting this material to bring the benefits of the equipment display to those that will be unable to attend the show and to form a reference work for those that do attend. Among the many new items, some of which are being shown for the first time, will be found something of value to every engineer, production superintendent or field foreman.*

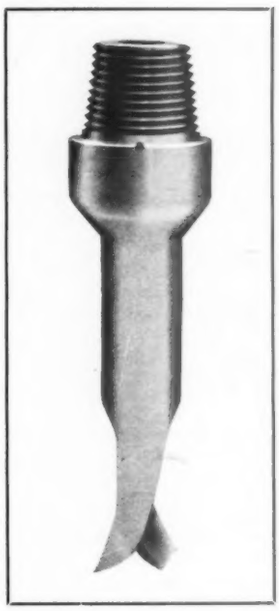
# Straight-Hole Advantages of a Long Bit With Pressure-at-the-Bottom Advantages of a Short Bit

**THE T-I-W-CHRISTIAN gives you all the advantages of a short bit and a long bit, without the disadvantages of either.**

**A superior feature in the design of the water courses is that the same size hole is drilled through shank and body of bit as that of the drill stem and tool joints. Thus the water is carried through the same size hole to very close to the cutting edge before being reduced to the two smaller holes that lead to each half of the blade.**

**Thus the T-I-W-CHRISTIAN BIT puts the maximum water pressure close to the bottom of the bit, no matter how long a bit is used. This principle has won great favor with experienced drillers who formerly used short bits for their faster drilling and long bits for straight hole.**

**Now the T-I-W-CHRISTIAN BIT gives both advantages in one bit—the straight-hole advantages of a long bit with the pressure-at-the-bottom advantages of a short bit.**



## *These Principles in the T-I-W Christian Bit Give Speed and a Straight Hole*

**More strength from tubular construction** than from the same material in another form. In the T-I-W Christian there is only one hole through the shank and body of the bit and that right through the center, thus obviating the reduction of strength that takes place when holes are drilled through the outer radius at points of greater tortion, as is the case with most fish tail bits.

**The material and workmanship** in this bit are the result of 20 years experience of the manufacturers, enabling them to select the best possible steel for fish tail drilling. This experience is reflected in the workmanship that goes into these bits, the machine finish and other qualities that are immediately evident to experienced drillers.

**Builds up sidewall.** Note the oval shape of the body of the bit. This shape is the result of successful experiments to construct a bit that would contribute to a high degree in the building up of the side wall. This shape of bit tends to plaster or shove the mud out into the wall, helping to build it up.

**Prevents balling up.** The oval shape gives the bit another important advantage over flat bodied bits. When this oval bit is rotating, there is less tendency for balling up, a feature that is not only immediately evident to the casual observer, but is conclusively proven by test and field experience.

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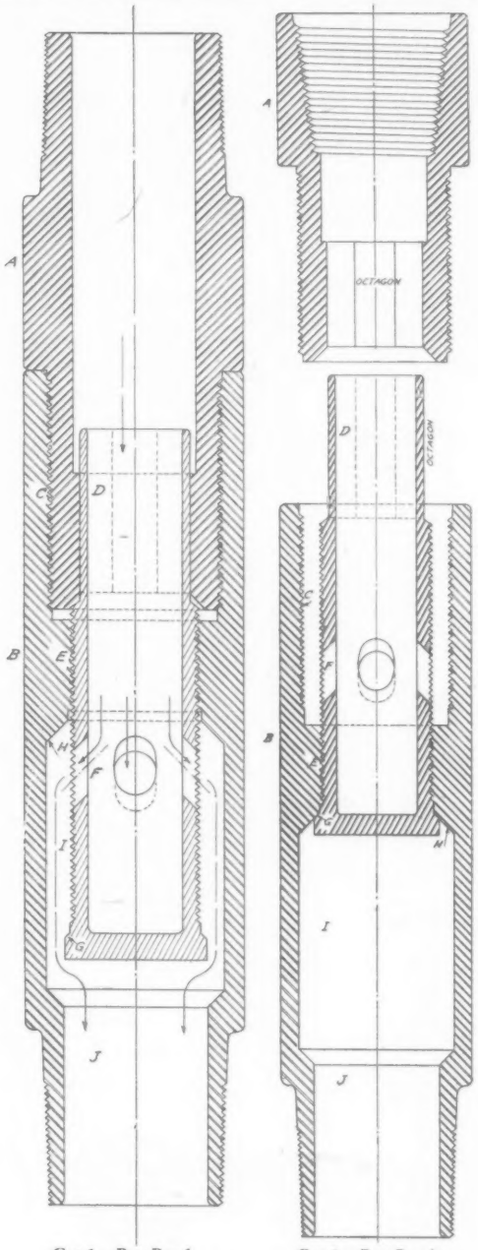



Cut 1—Pat. Pend. Cut 2—Pat. Pend.

INSTRUCTIONS FOR OPERATING VALVE

Cut No. 1 shows valve open and in drilling and circulating position. Cut No. 2 shows valve closed by removing top half of housing (a) and by replacing housing (a) valve is opened as shown in cut No. 1.

THESE Valves are invaluable when drilling in territory that is little known. It has been the general practice of all operators when they are drilling in a well or expecting to drill into a sand that would produce a high pressure to use a blowout preventor to prevent the well from blowing out between the drill stem and the casing. But they do not stop to think just what will happen if the well blows out through the drill stem. Here is what will happen: You have the blowout preventor closed around the drill stem; that part is safe, and it comes through the drill stem and blows through the swivel, hose and the pumps and cuts up those parts of the equipment which are not only expensive but endangers the lives of the men who are obliged to work on the rig. Oftentimes this causes a fire that means the loss of a rig and in some cases the loss of a well. And perhaps the gas will partly cut the hose off and you will be expecting it to blow off at any time and wait for hours, being afraid to send men on the rig, knowing that when it did come off that it would whip around and kill someone or in some cases wreck a derrick.

Now, with a T-I-W Drill Stem Blowout Safety Valve on the job all those hazards and many other things that can happen are eliminated by just simply closing the valve.

TO OPEN VALVE as shown in Cut Number 1: Slip housing "A" over octagon on "D", screw "A" into thread "C" which rotates valve "D", by the time holes "F" are clear of threads "E" there are enough threads made up at "C" so that housing "A" can not be blown out and "A" is then screwed down to shoulder.

OPERATION OF VALVE. Closed valve as shown in Cut Number 2. Unscrewing housing "A" at thread "C", turn at the same time valve "D" (which has octagon at top) at thread "E" until holes "F" are raised to a point past seat "H" or into thread "E" which closes valve before threads at "C" are clear. Continue to unscrew at "C" until seat "G" comes in contact with seat "H" which is a ground seat. Before seat "G" contacts with "H", threads "C" are clear, eliminating locking.

If trash gets in valve at holes "F", it will be sheared off as it comes in contact with threads "E" so that you are always positive of a cut off.

FLUID COURSE. Fluid enters valve "D" and out at holes "F" (which are on a 45 degree angle to eliminate cutting housing) into chamber "I" then through "J" to drill stem or any pipe that may be in use in well at this time.

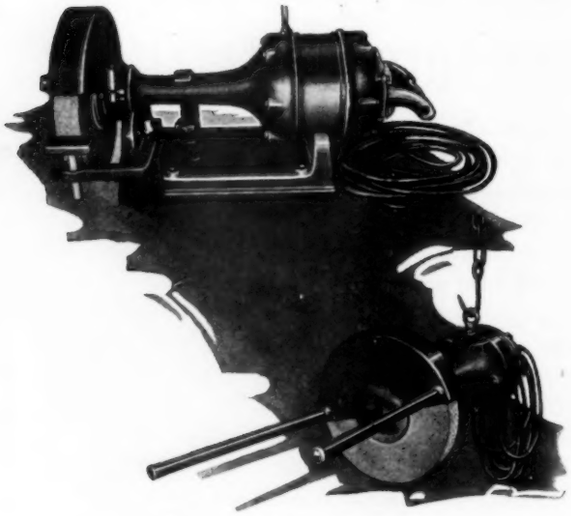
*Write for Price List and Folder.*

# TEXAS IRON WORKS

## SALES CORPORATION

1401-1423 *Maury Street* HOUSTON, TEXAS

## Stoody Company



*Stoody Universal Grinder*

Stoody Company, Whittier, California, is displaying two new machines, the Stoody universal bit holder, and the Stoody universal oil-tool grinder, and a full line of Stoody products.

The display will provide actual demonstrations of hard facing with both the electric welding arc and the oxy-acetylene torch. Attendants in the three booths will be prepared to answer all questions relative to the uses of hard facings of every type.

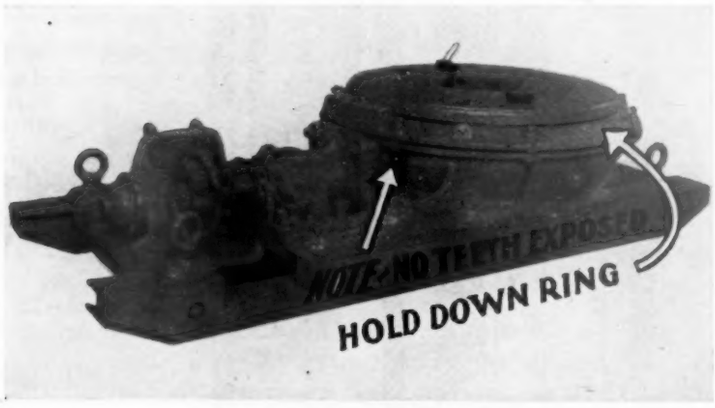
*Stoody Universal Bit Holder*

*Stoody Universal Oil-Tool Grinder*

## California Machinery & Supply Company

### ROTARY TABLE

California Machinery & Supply Company, Los Angeles, is showing the new fully enclosed all steel roller bearing Titusville rotary table; a 14 by 7½ Titusville Acme slush pump, the roller bearing, fully enclosed oil bath 12 by 12 twin steam engine with counter balanced crank shaft; the Titusville four cycle gas engine; Smith Separator Company's ever ready protector or tubing catcher; Macwhyte wire rope; and Continental Equipment Company's piston for slush pumps. Further plans call for exhibiting a rotary turbine pump which is a flowing device by which the gas drives the turbine, attached to which is a suction screw which picks up the oil and lifts it above the turbine.




*Titusville Rotary Table*

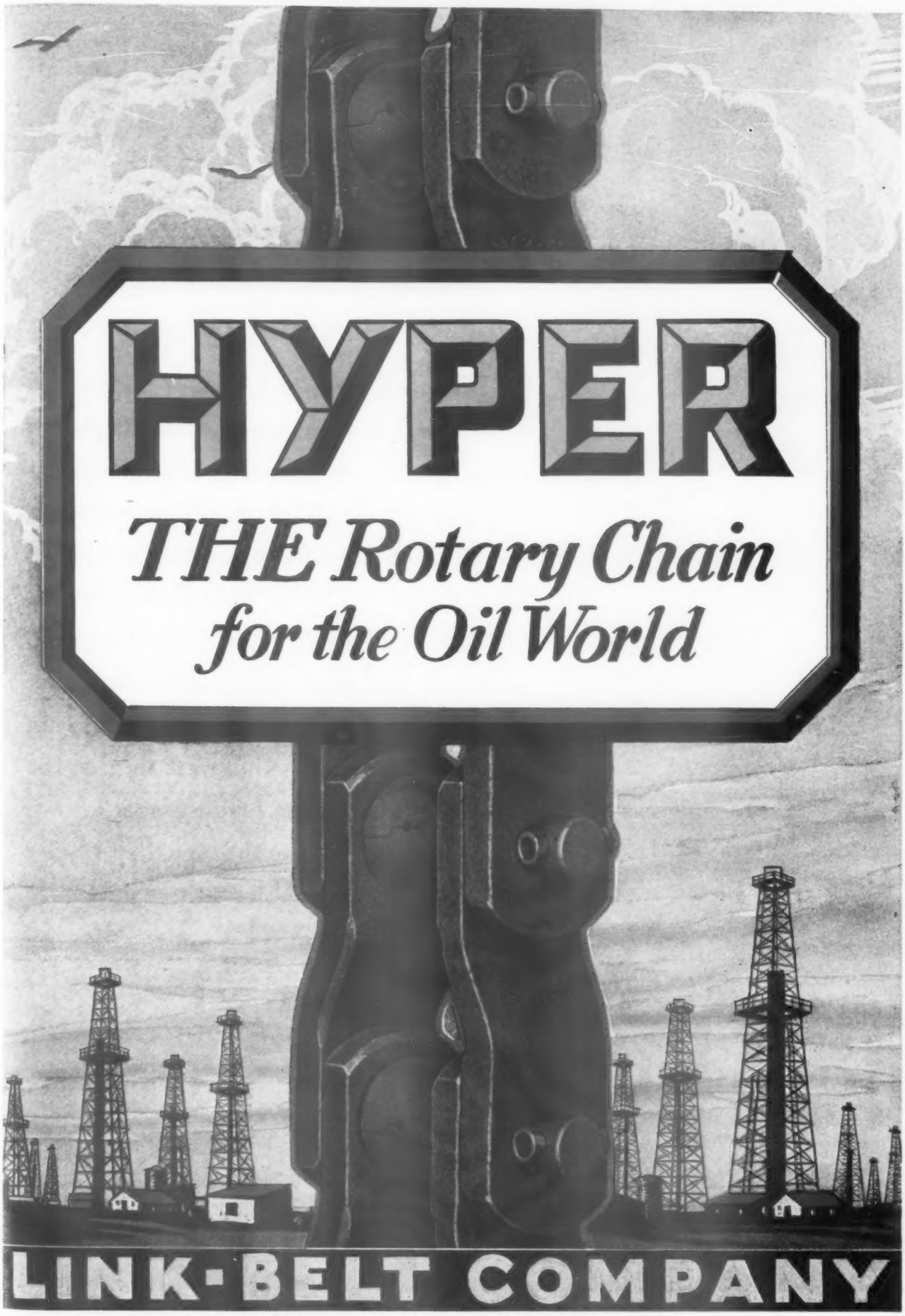
## Naylor Pipe Company

### NAYLOR SPIRALWELD LINE PIPE

Naylor Pipe Company, Chicago, is displaying the Naylor Spiralweld line pipe involving new engineering features that have never before been used. The spiral lock-seam, electrically welded by the Naylor process, provides a mechanically correct structure which gives improved structural strength with minimum weight—an important point in saving freight and handling charges.

The invention and development of the Naylor Spiralweld truss structure makes the pipe 50 per cent lighter in weight than standard weight wrought pipe, yet the structure is sufficiently strong with the proper factor of safety to permit the use of Naylor Spiralweld line pipe for standard pipe working pressures.

For longer life and resistance to rust and corrosion, Naylor spiralweld line pipe is made of toncan iron.




SEE OUR EXHIBIT, SPACE 81, AT THE OIL EQUIPMENT AND ENGINEERING EXPOSITION, LOS ANGELES

# HYPER

## Dependability

### Stands up under the toughest job

HERE you are, oil men—this is the new Hyper Rotary Chain that takes every pound of punishment your drillers can give it. Think of this! An ultimate strength of 75,000 pounds for Hyper SS-40, and 150,000 pounds for Hyper SS-124. Link-Belt Hyper, the toughest, strongest, and most dependable chain ever built for deep hole drilling, will stand up and deliver under the heaviest shocks, the stiffest strains and the hardest wear known to drilling service. Use the Link-Belt Hyper and forget chain troubles. It's THE Rotary Chain for the oil world.

**HYPER**
**SS-40**
**A.P.I. 3**
**75,000**
POUNDS
ULTIMATE
STRENGTH

**LINK-BELT HYPER CHAINS**

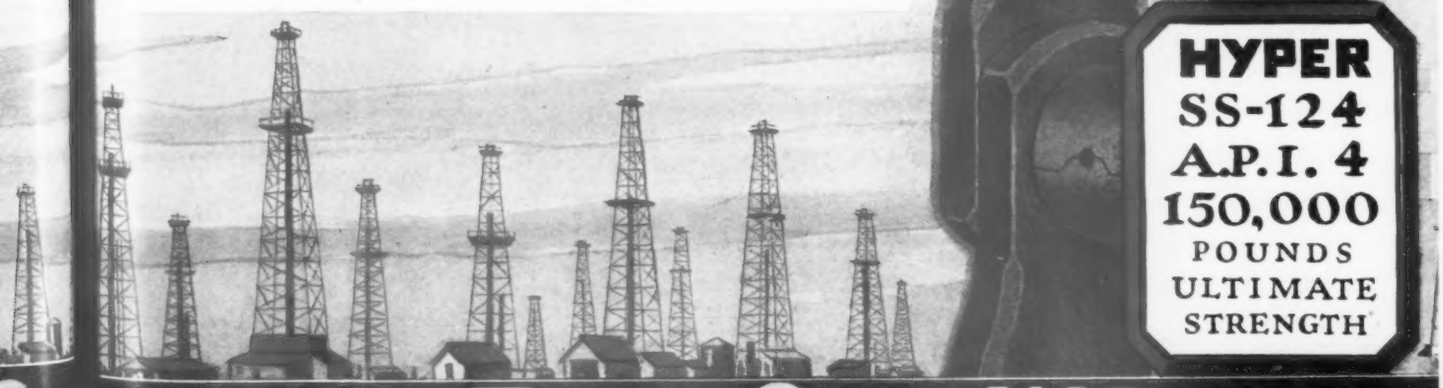
SEE OUR EXHIBIT, SPACE 81, AT THE OIL EQUIPMENT AND ENGINEERING EXPOSITION, LOS ANGELES

# HYPER

## Accuracy

### Precision in manufacture reduces wear

LINK-BELT Hyper sets a standard for strength and resistance to wear that has never been equalled. The mighty strength of Hyper lies in the tough alloy steels of which it is made. Its wearing resistance is the result of carefully planned accuracy in manufacture. So perfect is the finish, so precise is the fit of every Hyper part that the completed chain resists evenly the strains of severe service throughout its whole assembly. Deep drilling demands a new and more powerful chain. Link-Belt has produced this chain in the new Hyper, the supremely perfected Rotary Chain.



**HYPER**
**SS-124**
**A.P.I. 4**
**150,000**
POUNDS
ULTIMATE
STRENGTH

## FOR THE OIL WORLD

SEE OUR EXHIBIT, SPACE 81, AT THE OIL EQUIPMENT AND ENGINEERING EXPOSITION, LOS ANGELES

# LINK-BELT ENTERPRISE

* * *

Superior engineering and manufacturing resources achieve fresh triumph in wear and shock resisting

## HYPER
ROTARY CHAINS

FIFTY years of experience have earned for Link-Belt Company the reputation for dependability. Added to this is Link-Belt enterprise which brings Link-Belt dependability into every field where chains are needed.

It has been the Company's policy to improve and refine continually every Link-Belt product, to keep well in advance of current demands and to give the customer something better than he expects. This policy has developed Hyper Chains for the oil world.

Descriptive catalog of Hyper Chains, giving specifications and list prices, will be sent on request.

**LINK-BELT COMPANY**
Leading Manufacturers of Positive Driving Equipment
INDIANAPOLIS, IND., U. S. A.

3776

**LINK-BELT COMPANY**

SEE OUR EXHIBIT, SPACE 81, AT THE OIL EQUIPMENT AND ENGINEERING EXPOSITION, LOS ANGELES

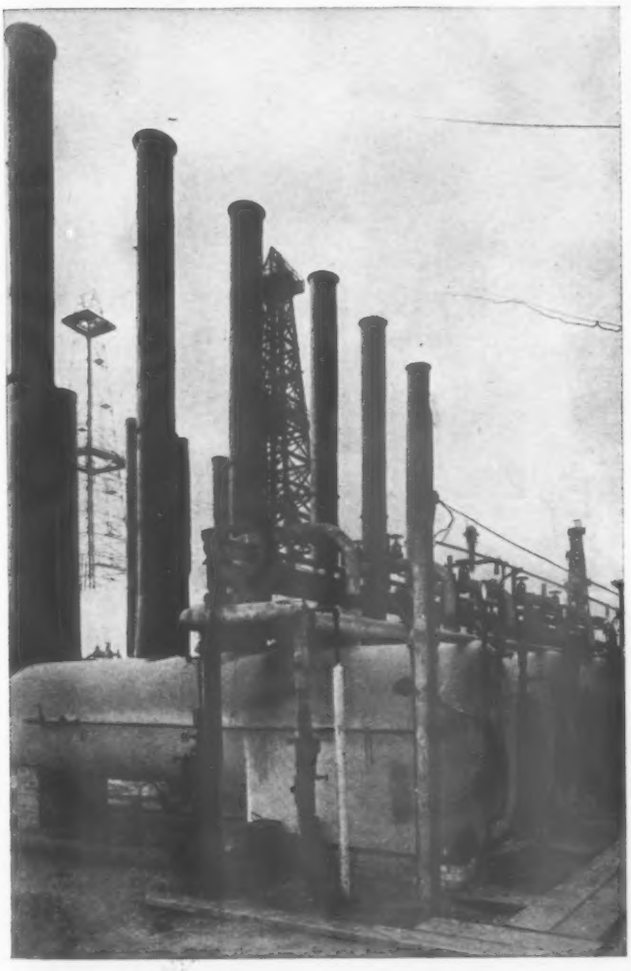
## Trimont Manufacturing Company, Inc.

### TRIMO PIPE WRENCH

Trimont Manufacturing Company, Inc., 55-57 Amory Street, Roxbury, Massachusetts, is displaying the new improved and mightier Trimo pipe wrenches, said to be the only pipe wrench on the market which is all steel, even including the rugged, reinforced frame. Trimo wrenches are put through a special toughening process designed to strengthen the steel by refining its grain structure.

## Leahy Manufacturing Company

### MULTI-JET OIL AND GAS UNIT



Leahy Manufacturing Company, 1804-10 East 8th Street, Los Angeles, is displaying its well known multi-jet combination oil and gas unit with refinements added in the past year.

One of the refinements in the unit is the improvement in the oil burner, which retains the outside mixing principle but is now so designed that the head is steam jacketed, which permits the head to be steam cooled and keeps the oil in the burner head from getting any hotter than the steam which is circulating around it. Carbon forming, a constant source of trouble in oil burners, is thus entirely overcome.

Another new feature is the feed water cock, diamond ported and provided with a lever handle and indicator which shows at all times the exact opening in the cock. It is constructed so it will not stick. Cocks are individually ground on a special machine and are subjected to a 500-pound cold water test. After being in service for some time, it can be reground at small expense, and put back into service again. It is so designed that the pressure on the key is equalized, allowing the cock to be opened or closed with ease.

The 3 by 9 unit on display is known as the Leahy high pressure Type C combination oil and gas firing unit, adaptable to front and rear firing of all types of boilers or stills and is especially desirable as a rear firing unit for a firebox type field boiler. The display also includes all other well-known units manufactured by this company.

## C. J. Tagliabue Manufacturing Company

### INDICATING TEMPERATURE CONTROLLER

C. J. Tagliabue Manufacturing Company, Brooklyn, is displaying a complete line of oil testing instruments, indicating thermometers, and temperature and pressure recorders. Among new developments offered by this company is the TAG indicating temperature controller, recommended particularly for tower control purposes. This instrument is furnished with an outside setting knob so that the setting pointer can be positioned at temperature for which regulation is desired. The dial is calibrated in actual degrees temperature and the indicating pointer shows at all times how well the control point is being maintained. An internal adjustment makes it possible to increase or decrease the throttling range of the instrument.

## J. H. Williams & Company

### VULCAN SUPERIOR PIPE AND FITTINGS TONGS

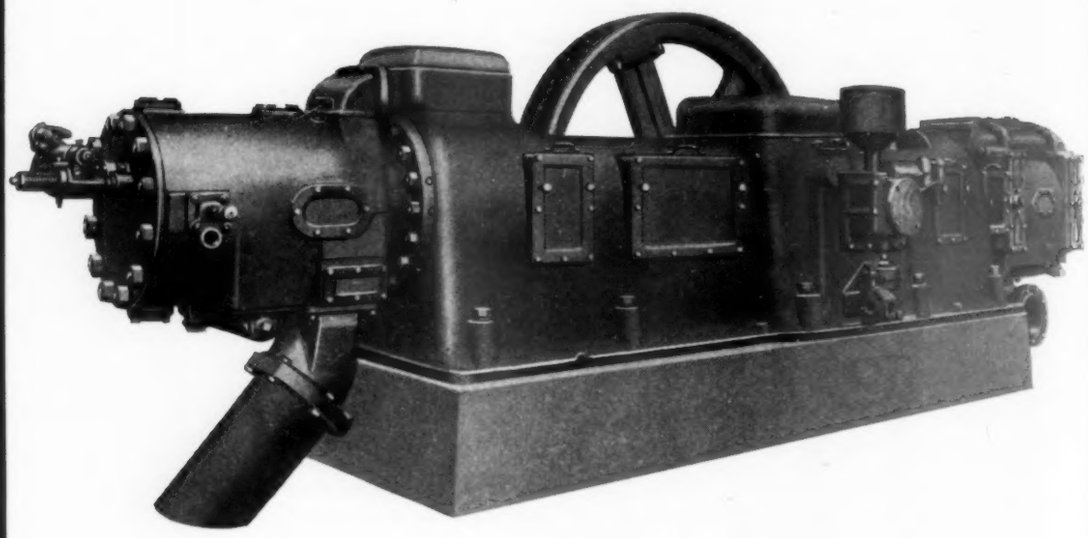
J. H. Williams & Company, Buffalo, are displaying the "Vulcan superior pipe and fittings tongs," and the "Vulcan boll weevil" chain pipe tongs.

The Vulcan superior tong has reversible pipe and fitting jaws; the jaws, when worn, may be turned end-for-end, thus having double length life.

### VULCAN BOLL WEEVIL CHAIN PIPE TONGS

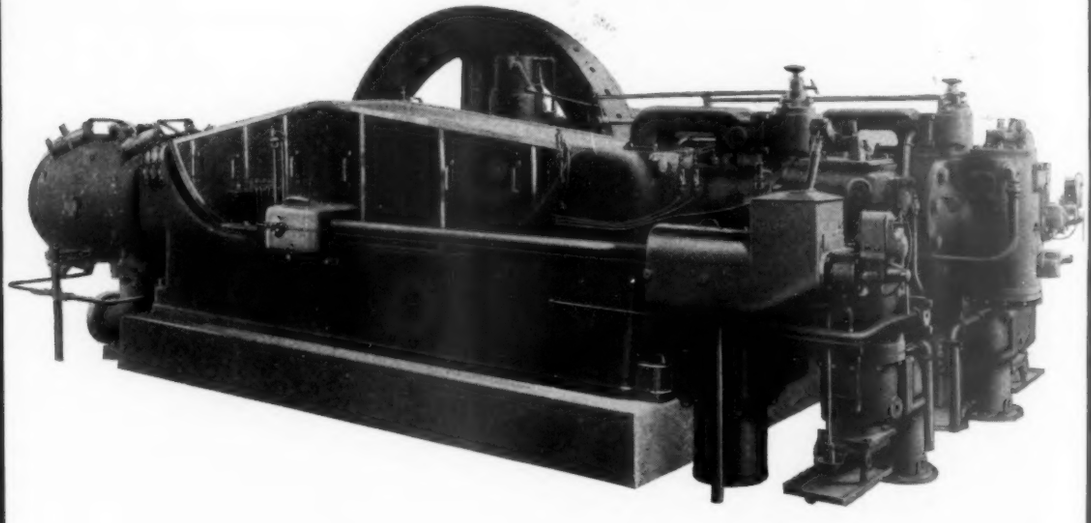
The boll weevil tongs is designed to make flat pipe work and pipe line work easier, as holding up heavy tongs is eliminated in its use, thus saving time and effort. The arc of the jaws and shape of teeth give positive bite, and the jaws are reversible for double life. It comes in four sizes for three-fourths to 12-inch pipe.

# 2-CYCLE OR



**TYPE-10**
Cooper-Bessemer gas engine or gas engine driven compressor unit in single and twin cylinders 95 to 200 B. H. P.

# 4-CYCLE -



**TYPE-80**
Cooper-Bessemer gas engine or gas engine driven compressor unit in single and twin cylinders. 85 to 190 B. H. P.

# YOU'RE ALWAYS SAFE IN CHOOSING A COOPER-BESSEMER

YOU'VE heard the time-honored arguments in favor of 2-cycle engines—lower initial investment, simpler construction, lower operating and maintenance costs.

And you've heard for years that 4-cycle engines run more smoothly, more steadily, and with less fuel gas.

Consequently, when engine-buying time comes around, you find yourself face to face with this question: *Shall we buy from a 2-cycle builder or from a 4-cycle builder?*

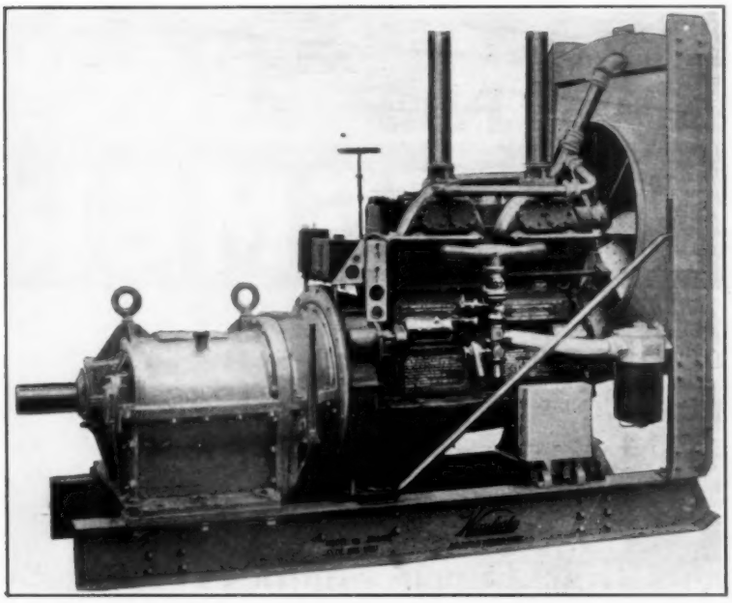
Today—because the leading 2-cycle builder and the leading 4-cycle builder have joined forces for greater service to this Industry—your problem is answered: *You're always safe in choosing a Cooper-Bessemer.* Buy the type that suits your purpose best!

*Our District Representative will gladly tell you about these improved engines or mail you new bulletins.*

THE COOPER-BESSEMER CORPORATION
Formerly The C. & G. Cooper Company and The Bessemer Gas Engine Company
Mount Vernon, Ohio Grove City, Penna.
*Branches in all principal cities*

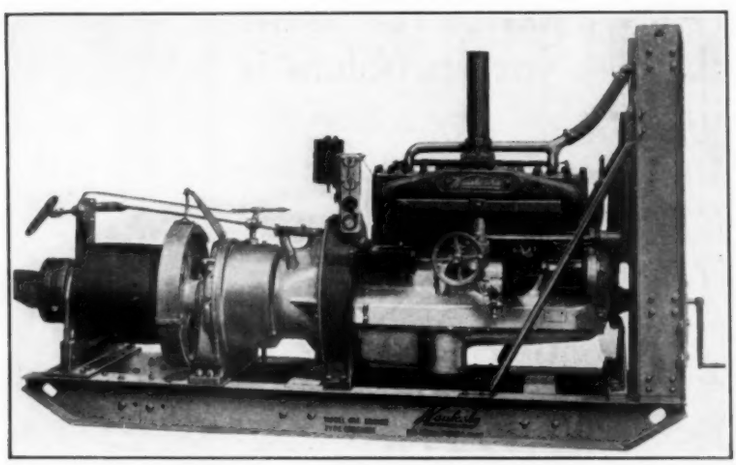
# Waukesha Motor Company

## PORTABLE POWER UNIT



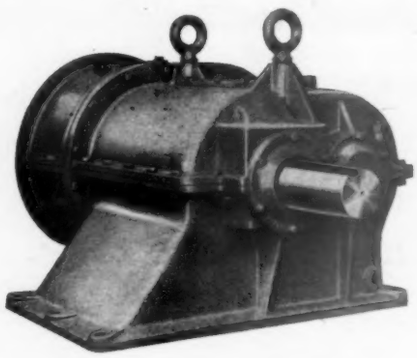
Waukesha Motor Company, through its new California representative, Waukesha Industrial Engine Sales & Service Company, is presenting for inspection, the first time on the coast, two of this company's most popular types of oil field power.

The WKS oil field power unit as illustrated is a stationary power unit, yet readily portable. The engine rates as 120 horsepower at 950 r.p.m. engine speed, is direct connected to a 4:1 herringbone speed reducer and uses either gas or gasoline for fuel. The exhaust manifolds are thoroughly water jacketed, making them exceptionally safe for operation anywhere in the oil fields; large hand holes are provided to remove scale and sludge. The cooling system has been augmented to accommodate this extra demand and a large fan and radiator are provided for handling the requirements under the most severe operating conditions.



### "GAS-POWER MIXER"

A patented Waukesha feature is the "gas-power" mixer for use with natural gas fuel. Run on natural gas, the mixer is unusually sensitive to variations in load and power demand, responds instantly to the governor with a constant proportioning of the gas and air so that maximum fuel economy is obtained under all conditions of load and speed. A dial gas cock is placed close to the "Gas-power" mixer for use in starting while a telegraph throttle control is provided to handle the power demand from the derrick floor. Large air cleaners, electric starting equipment, fully enclosed super-oiled governor, full pressure lubrication and Ricardo combustion chambers are also features of the engine itself. The structure on which the engine is mounted is unusually deep and rigid, the two steel I-beams being connected by cross girders with gusset plates for reinforcing and stiffness.



### HERRINGBONE SPEED REDUCER

On the extension of the bed is mounted the Waukesha herringbone speed reducer. This speed reducer has been designed especially for the oil fields, with extra care and attention being given to accessibility for inspection, adjustment and repairs in the field. Large inspection openings and special construction permit easy and quick replacement of clutch-discs and other parts without disturbing alignment or interfering with any of the speed reducer mechanism. On the engine speed and counter shaft bearings, self aligning, double row anti-friction bearings have been used, while two large replaceable plain bearings rigidly support the low speed shaft. A feature of the speed reducer is the internal lubrication of the bearings through the gears themselves as they move, partially submerged, in a bath of oil. In the cover of the speed reducer are two large eye bolts, either one of which is capable of handling the speed reducing unit complete.

### GREAT SIX PORTABLE POWER

Although not on display at the Exposition, the outside development in oil fuel machinery by this company during the past year is the Waukesha Great Six portable power, developing 275 horsepower at normal operating speed, complete with clutch and drive sheave. It can be loaded on a standard seven-ton truck and transported with a minimum of time and expense.

The engine is adapted as a drive for pumps, compressors, rotary rigs and draw works, or, in fact for any power purposes within its capacity, and has a 24-hour operating capacity.

To make it suitable for either fuel, a special manifold is provided so that the change from natural gas to gasoline can be made in the field with no special tools, and quickly. It is equipped with the Waukesha "gas-power" mixer, air cleaners, telegraph throttle control, and all accessories necessary for

THERE IS NO ECONOMICAL SUBSTITUTE FOR QUALITY

# Consider Your *cost* OF Balls & Seats

DO YOU PAY $ .55 OR $55.00 OR $5.00 ?

The cost of a ball and seat at the supply store averages about 55c.

If, at the end of twenty days, the ball and seat fails, a pulling job is caused, that might cost in labor and lost production approximately $18.15.

In another twenty days' period this same cost must be again figured.

Then a third job is caused, costing another $18.15

Therefore, it is evident that if the balls and seats are not the proper type that will give sustained performance, the actual cost of each ball and seat during the given period of time easily amounts to $55.00.

Consequently, it is vitally essential that you select the most durable ball and seat, made of suitable materials, properly heat-treated and accurately finished. The resultant cost over a period of time, including labor of installation, will be around $5.00.

It is the average run of hundreds of balls and seats that counts. In the production of Axelson Balls and Seats extreme measures are taken in the heat treatment to get the most out of the best material. Axelson's special care and practice is more than justified by the fact that the ultimate cost to the user of this pumping equipment averages approximately one-tenth that of ordinary balls and seats.

**Axelson Manufacturing Co., Ltd.**

P. O. Box 337, Los Angeles
Tulsa St. Louis
New York City—30 Church St.

*Mid-Continent and Eastern Distributors*
FRICK-REID SUPPLY CORPORATION

# AXELSON BALLS & SEATS

# The Emsco free-circulation PROTECTOR

## embodies all the desirable features of previous types

## *plus*

## new and improved features *exclusively* EMSCO

When the Emsco Protector is placed on the pipe, the steel cage surrounding the tough rubber body is drawn together by a tapered steel pin. Pin and slots are so designed that the pressure on pipe, as pin is driven into place, is precisely the same at top and bottom and throughout the intervening space on protector, and evenly distributed around the pipe. The pin is provided with a slot ("a") which fits into a corresponding rib in the steel cage, automatically locking the protector on the pipe when completely installed as in Fig. 2 ("aa"). Another slot ("b") is provided in the pin for breaking off when installed.

Distributed by
THE CONTINENTAL SUPPLY COMPANY
General Offices: St. Louis
THE CONTINENTAL SUPPLY CO., Ltd.
224 Traders Building, Calgary, Alberta, Canada
*Export Offices:*
CONTINENTAL EMSCO COMPANY, INC.
74 Trinity Place, New York
London Offices: 316-17 Dashwood House, Old Broad St., E.C. 2

# An Engineering Achievement In Pipe Protection

Fig. 1

The Emsco *Free-Circulation* Protector embodies *all the advantages desired in appliances of this type.*

While providing positive protection to the drill pipe, casing, tool joints and collars, *it insures free circulation of mud and fluid at all times, due to the exclusive Emsco design which provides an area of circulation space (see Fig. 1) that by actual measure is greater than the total volume of fluid forced through the rotary hose.*

This extraordinary free-circulation area *insures against closing up or restricting the space between drill pipe and casing, and causing a suction in the hole, or pulling the fluid out of the hole when coming out.*

The Emsco Protector can easily be installed in from 30 to 35 seconds, *and cannot snap off the pipe under any circumstances.*

It obtains the tightest, firmest grip possible to obtain by mechanical means (see Fig. 2) *and cannot slip, pile or overlap when in the hole under any degree of pressure.*

Emsco Protectors withstand more abuse *and last from four to ten times longer under the same service conditions.*

Emsco rubbers are made flat (see Fig. 3), in shallow molds, under 200-tons hydraulic pressure by direct rams, from the finest materials; *and, therefore, are not subjected to expansion strains at any time during process of manufacture, while being installed, or when in service*—a feature which prevents serious damage or destruction by cuts or tears.

Their efficiency cannot be impaired until *all the tough rubber offsets are entirely* destroyed.

Emsco tough rubber "bumpers" are an integral part of the flat rubber body and *provide* extraordinary resiliency and cushioning effect on the pipe.

Emsco Protectors cannot be destroyed or expanded by circulating oil in the hole due to the new and exclusive Emsco method of construction and compounding of rubber.

Fig. 3

Fig. 2

## E. M. SMITH COMPANY

637 So. Clarence St., Los Angeles, California

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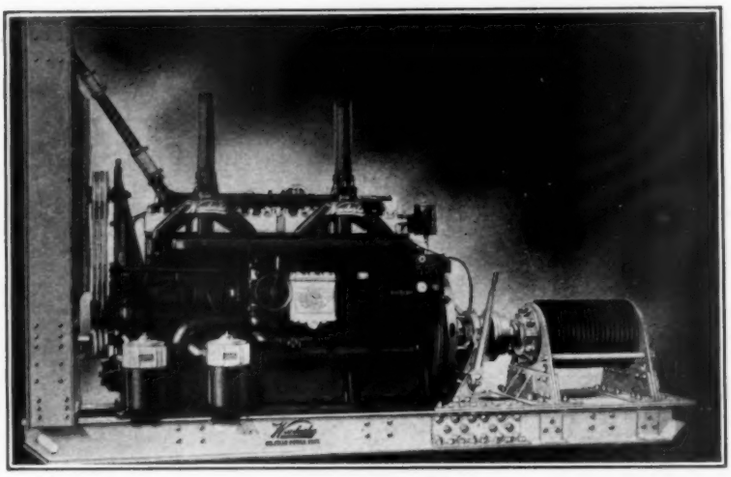
CONTINENTAL EMSCO COMPANY, INC.
74 Trinity Place, New York
*London Offices:* 316-17 Dashwood House, Old Broad St., E.C. 2

Our new descriptive circular contains complete information regarding the design, construction, advantages and performance of Emsco Free-Circulation Protectors. Companies and individuals are urged to write for this circular at once and learn about this greatest of all protectors.



operation. A compressed air starter is available, and auxiliary drives can be had for tachometers, air compressors, forge blowers or other small power purposes about the oil field. It is equipped with a special power take-off and clutch, extra large hand holes, and a full pressure filtered oiling system.

## American Hammered Piston Ring Company

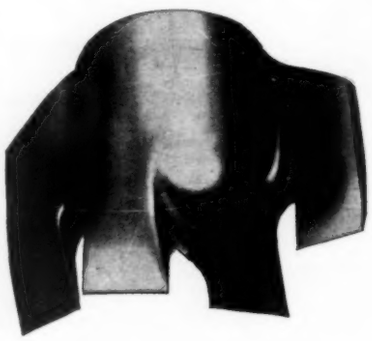
### RINGS

The American Hammered Piston Ring Company, Baltimore, is displaying a complete line of rings. Beside the standard product, a single piece concentric hammered piston ring, there is the ventilated oil control ring demonstrated by a machine showing exactly how this ring functions in the engine. A hammering machine is operating to show the company's patented method of hammering. The company's bronze rings for water pumps and acid resisting rings for severe gas conditions are shown. Too, the company is showing its patented rod packing which uses hammered contracting rings instead of springs.

## Elliott Core Drilling Company

### DRILLING BIT

Elliott Core Drilling Company, Los Angeles, is displaying a new drilling bit, combining the advantages of the fishtail bit with its simplicity, and the smoother action of the newer type bits. A carefully rounded contour combined with five circulation ports placed at strategic points force the circulating mud against the cutting surfaces in a manner best suited to clean the blades. Adequate reaming surface has been provided and the bit is so constructed as to allow a minimum of riding surface. It is supplied with an Acme thread tool joint box identical to that used in Elliott coring heads for the past five years, and can be discarded after a hard run. Short double pin subs as strong as the best drill collar are furnished to make the proper connection with different drill collars.



## Cameron Iron Works

### BLOW-OUT PREVENTER

Cameron Iron Works is displaying, through its distributor, the Petroleum Equipment Company, 2800 South Almeda Street, Los Angeles, a steam operated blow-out preventer, a snubbing device utilizing two of the control heads, and a regular type tubing control.

The steam operated blow-out preventer employes a four-way operating valve to be placed at a safe distance from the well, to curb the highest and most dangerous pressures without any member of the crew going near the derrick. This is accomplished by extending pressure lines from the source to the blow-out preventer which is mounted below the derrick floor. The valve opens and closes the blow-out preventer on a quarter turn in either direction. The preventer utilizes the friction developed between steel and steel to hold the drill stem or casing, in the hole. Two steel rams with concave faces grip the drill stem. These rams are packed with a hydraulic rubber packing designed to become tighter as the pressure increases. In addition, the rams are securely fastened around the drill stem by four-foot closing wheels which are extended away from the hole by 14-foot extension pocket wrenches. A recent improvement is the addition of Alemite lubrication of the rams, Alemite plugs being mounted on each side of the top of the preventer with an opening clear through to the ram.

### TUBING CONTROL HEAD

The tubing control head is displayed in two sizes; the regular type is tested to 1200 pounds, and is recommended for use on wells developing less than 500 pounds pressure; the heavy duty type is tested to withstand 6000 pounds and is designed for use on wells developing over 500 pounds pressure.

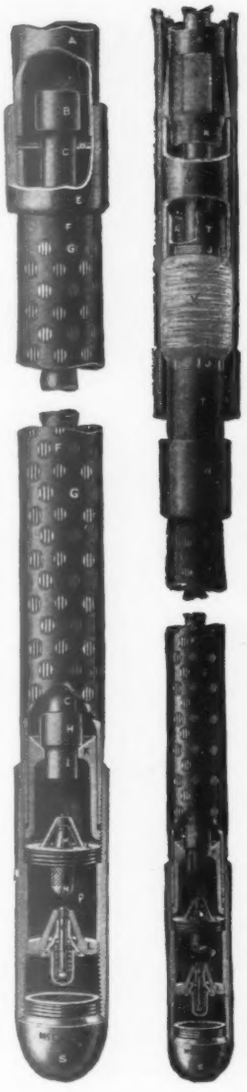
The main body is cast in one piece of tough steel with flowline openings on either side, and is equipped with the same type steel rams used in the blow-out preventer, the rams being machined on top and bottom in order to suspend tubing with the aid of couplings.

# Particular Oil Men Prefer the McEvoy Strainer

SOME REASONS WHY THE McEVOY WIRELESS STRAINER HAS NEVER BEEN EXCELLED

1. McEVOY WIRELESS SCREENS are made from the best known material, wrought iron and steel pipe of random lengths and standard sizes, weights and threads, or in special lengths and heavy weights when ordered, as well as in *Anti-Corrosive Brass* and *Bronze* pipe.
2. They are equipped with Non-Corrosive Brass Strainer Plugs to resist action of salt water, sulphur, and mineral acids, or with Heat treated, Case Hardened Steel Plugs to resist sand cutting under high gas pressure.
3. They are index drilled uniformly throughout their lengths, insuring more uniform strength in the pipe for rotating, driving or spudding, than if drilled in the usual haphazard manner.
4. They have no projections on the outside or inside surfaces of the pipe; strainer plugs do not increase the outside or change the inside diameter of the Strainer Pipe, and are therefore safe and may be handled like blank pipe.
5. They are not limited to a few sizes of pipe or meshes. Can be furnished in any size pipe, with couplings or flush joint, and any mesh, from finest to coarsest.
6. They can be safely and freely put into crooked, or smaller holes than other makes of Strainer of the same size pipe, and will go safely wherever a piece of pipe of the same size will go.
7. They can be rotated, driven or spudded the same as pipe to the limit of what the threads will stand, if compelled to get down through boulders, or gravel, or to "side track" lost pipe or tools, without harm as strainer plugs are set in pipe slightly below the surface and are protected by the pipe.

Los Angeles, March 16-23, 1930



## THE MONEY POINT

On one side is the oil sand that has potential value. On the other is oil that has real value.

Oil men who have the reputation for doing everything "just right" are very careful when it comes to the work done and the kind of equipment used at the bottom of the well—the point where potential profits are converted into real profits.

That so many oil men of this type select McEVOY STRAINERS is evidence of their leadership.

*Write for complete catalog on McEVOY Universal Tubing Control Heads; McEVOY Wireless Screen; and all McEVOY Products.*

# J. H. McEVOY & COMPANY

## HOUSTON, TEXAS, U.S.A.

Pacific Coast Branch: McEVOY SCREEN PIPE CO., 2428 E. 56 St., Los Angeles, Calif.

# ALL IDEAL-AJAX

IDEAL-AJAX 12x12 Roller Bearing Engines were used in drilling these wells — left foreground well is that of Cullen & West Oil Co. — the other one on the left side of the road is that of the Humble Oil & Refining Co. — and on the right side of the road, the Texas Co.

100% IDEAL-AJAX equipment — 100% performance. In fact, about 70% of all the steam drilling operations in the country are taken care of by AJAX and IDEAL-AJAX Engines.

# IDEAL-AJAX

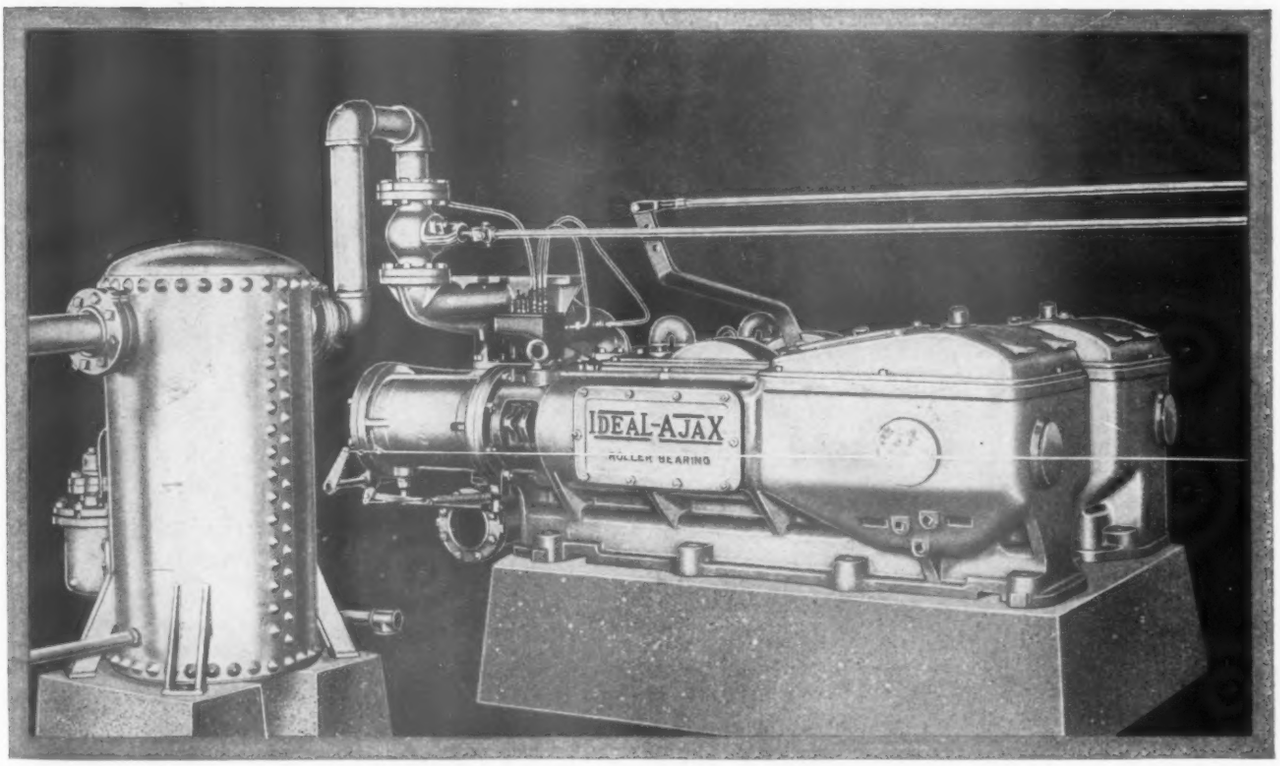
## ROLLER BEARING STEAM DRILLING ENGINES

*Ask the National Supply Man for Details.*

# in the Humble Oil Field

The new large-capacity Separator will improve the operation of all AJAX and IDEAL-AJAX Engines where there is special need of keeping water from cylinders. While this steam Separator was first used with piston valve engines, it also operates to advantage with slide valve engines. This hook-up relieves engine of strain necessary to force water back through the valves, improves lubrication because water is not present to wash sides of cylinder walls and valve seats.

Made by AJAX IRON WORKS, Corry, Pa.




Latest Model IDEAL-AJAX Twin Roller Bearing Engine with Large Capacity Steam Separator

*Ask the National Supply Man to tell you about it.*

## Link-Belt Company

### HYPER CHAIN

Link-Belt Company, Indianapolis, is displaying its new Hyper line of chains incorporating the maximum of strength with the maximum of durability.

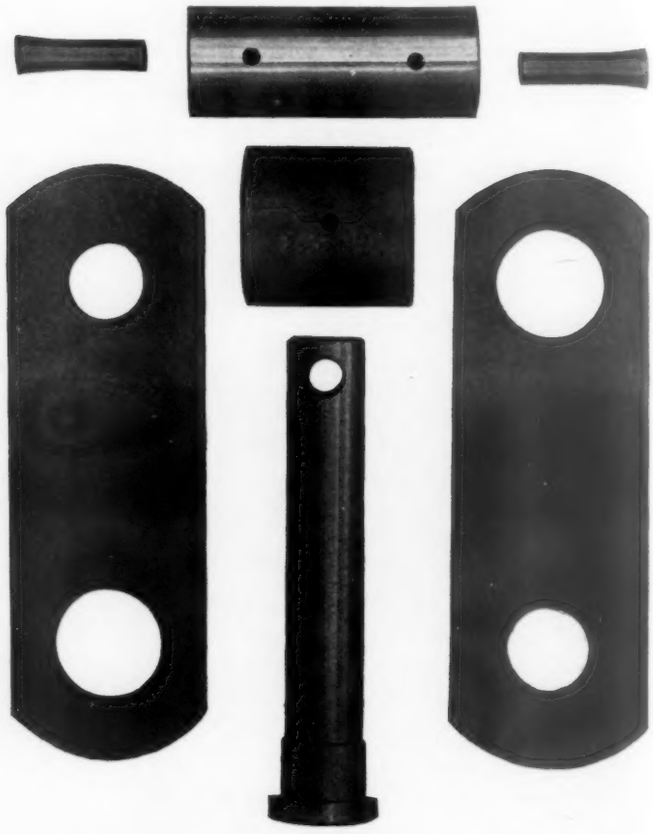
Pins of the new unit are forged from alloy steel stock, and after heat treatment the surfaces are accurately ground. The bushings are machined from alloy steel stock, and after heat treatment, are ground not only on the outside diameter, but also in the hole which engages the pin. The internal grinding of the hole is a novel feature in chain construction.

The side bars are made from alloy bar stock with holes which receive the pins and bushings being conditioned by an entirely new process in chain manufacture, providing holes which are not only accurate but which are also densified by burnishing operations.

Rollers are made from alloy strip stock, accurately formed into a round shape and are of the so-called "curled" type; they are heat treated.

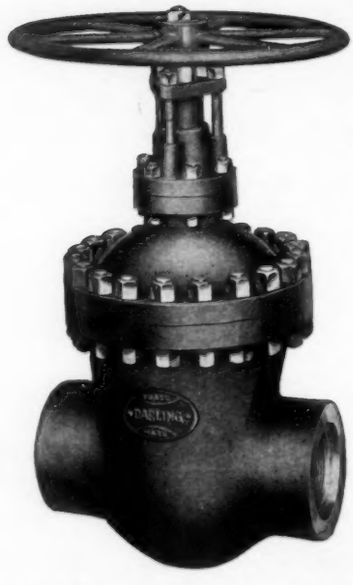
The cotters are of a special type (patent applied for) and are so designed as to not work loose when once inserted and swelled into the holes provided in the pin ends for their reception.

Conservative rating for the new chains follows: Hyper SS-40, 75,000 pounds average ultimate strength; and Hyper SS-124, 150,000 pounds average ultimate strength.



## Darling Valve & Manufacturing Co.

### DARLING GATE VALVE

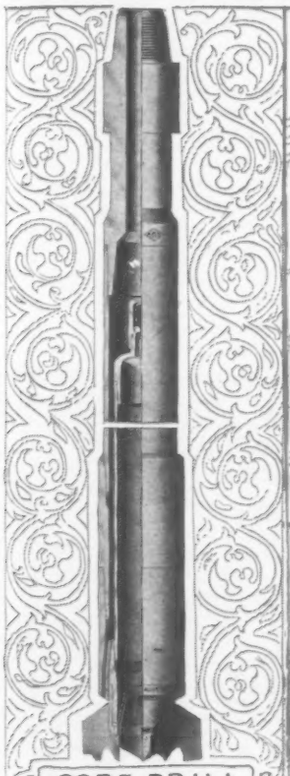


Darling Valve & Manufacturing Company is exhibiting its new Darling forged steel drilling gate valve, which embodies the same principles of construction that this company's other products have possessed, including the same type of double revolving gate discs, parallel seats and compound equalizing wedges.

Operators everywhere are finding these forged steel drilling gate valves satisfactory where pressures are high, and a valve of great strength is necessary.

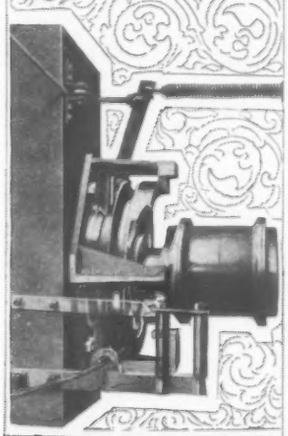
This new equipment will be on display at the exposition in the booths of the Petroleum Equipment Company.

# MEN • WHO • KNOW • OIL • • • KNOW AL-N-OL

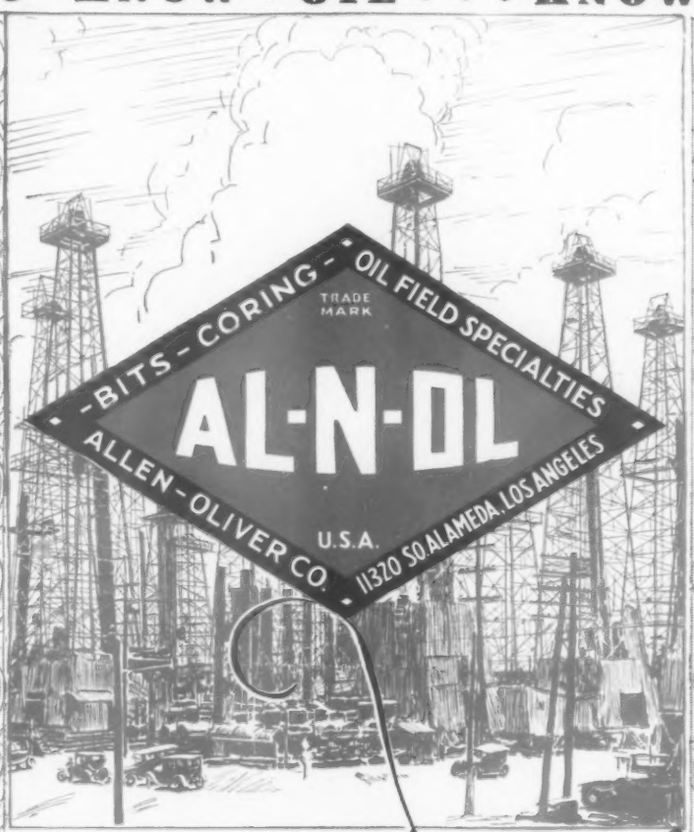


CORE DRILL

4-WAY DRILLING BIT



AUTOMATIC CATHEAD




*The symbol of*

# A NEW LEADER

**ALWAYS a step ahead in modern engineering features, keeping abreast in the march of new ideas, employing only the newest and best methods — these are the things that have built this company from a modest plant serving only a limited territory into a great national institution within a few short years.**

**This group of skilled engineers and mechanics have long been identified as pioneers in the development of modern coring and drilling equipment.**

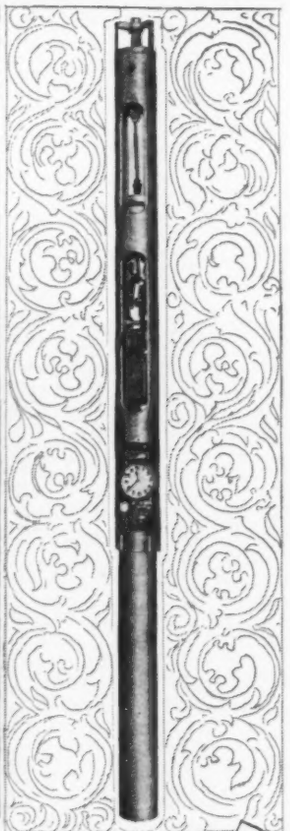
**Their symbol is a pledge of future leadership and your assurance that the product on which it is placed will continue to uphold the fine ideals and traditions of the Allen-Oliver Company.**

***A handsome new catalog containing information and data on all AL-N-OL products will be mailed to any official or operator upon request.***

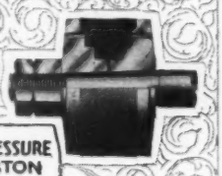
## ALLEN-OLIVER COMPANY
INCORPORATED

**11320 SOUTH ALAMEDA STREET, LOS ANGELES**

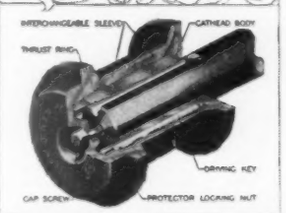
**DEALERS AND DISTRIBUTORS EVERYWHERE**



WELL SURVEYING MACHINE



HI-PRESSURE PISTON

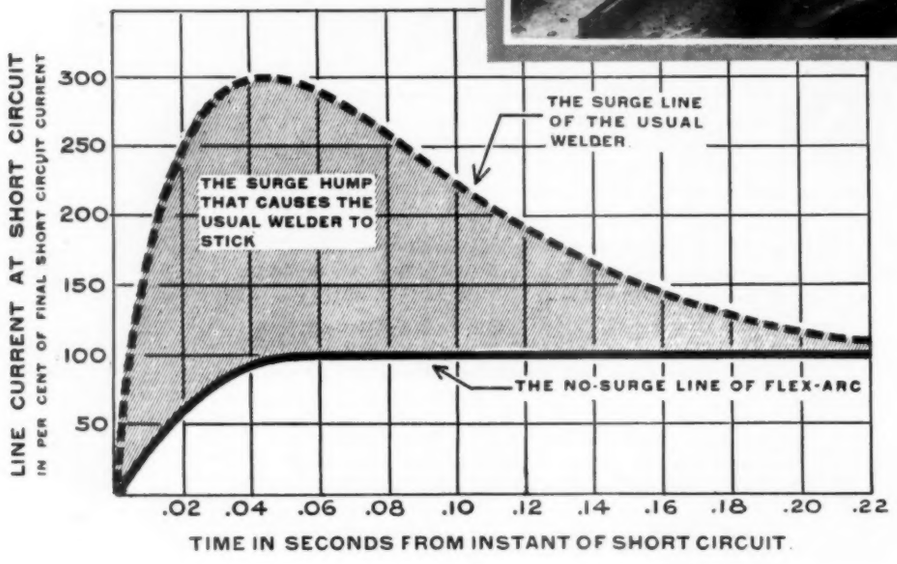



SLEEVE TYPE CATHEAD

# AL-N-OL

# Flex-arc

## THE NEW WESTINGHOUSE WELDER


LINE CURRENT AT SHORT CIRCUIT
IN PER CENT OF FINAL SHORT CIRCUIT CURRENT
300
250
200
150
100
50
THE SURGE LINE OF THE USUAL WELDER
THE SURGE HUMP THAT CAUSES THE USUAL WELDER TO STICK
THE NO-SURGE LINE OF FLEX-ARC
.02 .04 .06 .08 .10 .12 .14 .16 .18 .20 .22
TIME IN SECONDS FROM INSTANT OF SHORT CIRCUIT

The extreme arc stability of the Flex-arc welder is evident by its speedy performance out in the wind.

No Sticking
(*no current surge*)
on short circuit—
the speed formula
of Flex-arc

*. . . Another Contribution of Westinghouse Research . . .*

# NO ELECTRODE sticking *gives* *Speed with Precision*

NO longer does the operator have to "fight the arc". Electrode sticking, the speed handicap of many skillful welders, has been removed.

Westinghouse announces a new *non-surge welding circuit,* now embodied in the efficient and dependable Westinghouse sets, affording welding speeds and an effective range of application heretofore impracticable in welding practice.

This new principle places at the disposal of the operator a machine which enables him to employ his skill to the fullest extent. He can weld thin material—then change electrodes and turn *one* dial—and weld a piece of heavy steel. And at every step of welding current adjustment, he can start and maintain the arc with the utmost ease.

For such flexibility of application and of electrical characteristics in meeting welding requirements, Westinghouse presents the *Flex-arc* line of welding sets to industry.

Fill out and mail the coupon to our nearest office for information about this new welding advancement.

WESTINGHOUSE ELECTRIC & MANUFACTURING COMPANY
Advertising Dept. E. Pittsburgh, Penna.

Gentlemen:

Please send me Flex-arc information. I should also like to receive copies of your Data Bulletins, entitled "I am Arc-Welding".

Name .....

Address .....

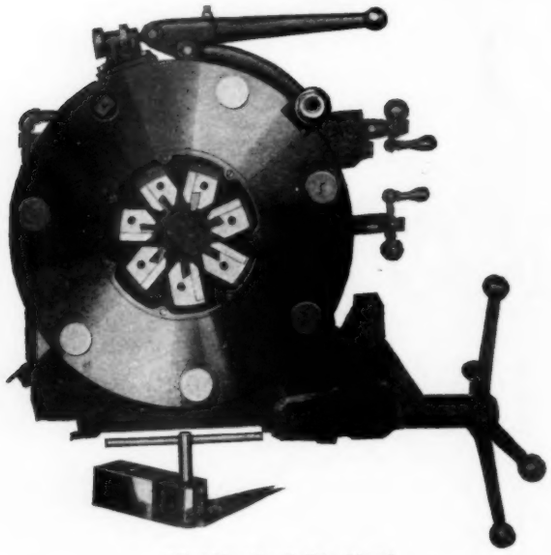
.....

*Service, prompt and efficient, by a coast-to-coast chain of well-equipped shops*

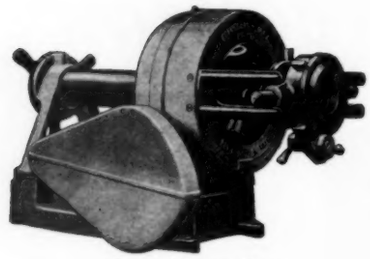
**Westinghouse**

T 31112

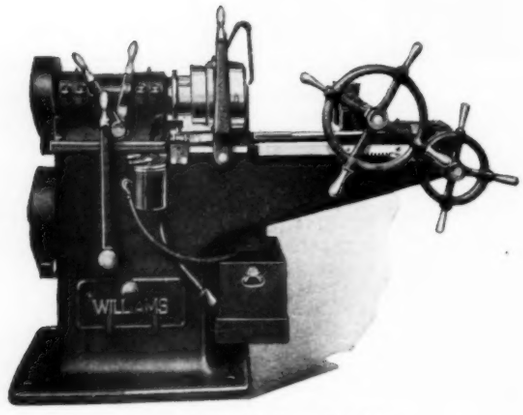
## Oster Manufacturing Company



*"Rapiduction" Die Head*



*Oster Power Boy*



*"Rapiduction" Bolt Machine*

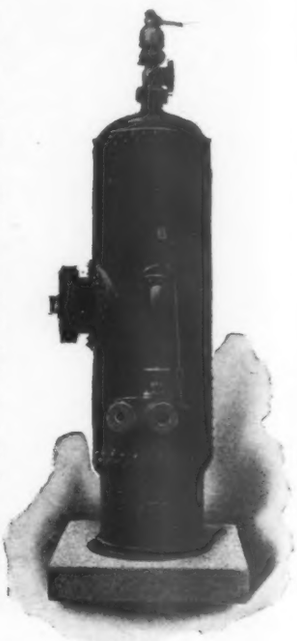
Oster Manufacturing Company, Cleveland, is displaying a complete line of pipe and bolt threading equipment, including the Williams "rapiduction" pipe and bolt threaders, the Oster "power boy" portable pipe threaders, the Williams "Wilco" machine, and the Oster entire line of hand-operated tools for pipe and bolt work.

The Williams "rapiduction" die head was originally designed for use with the Williams "rapiduction" machine, but is now applicable to all barrel type pipe machines. It is equipped with one set of high speed steel chasers, which thread all sizes of pipe within the range of the machine where the pitch of thread does not change and the change of setting from one size to another can be made in a fraction of the time formerly required. Other features of the head are the cutting-off, reaming and chambering tools, which are built in it and the tool for cutting the grooves for victaulic couplings. A special taper attachment permits the use of the regular "rapiduction" head and dies for correctly tapered threads of any length.

## Trumble Gas Trap Company

### GAS TRAP

Trumble Gas Trap Company, Los Angeles, is showing the new Trumble two-way tank valve, and a design and redesign of its separator.



The Model "W" separator is a newly designed trap for 350 pounds working pressure and is built in accordance with A. S. M. E. requirements throughout. Heads are elliptical, which in addition to being the best engineering practice, are also a decided improvement in appearance. All connections over three inches in diameter are flanged and completely reinforced in both saddle and rivet shear. Models "R" and "Q" are newly designed low pressure traps; and Model "I" for 525 pounds pressure is redesigned to meet the code requirements, and the operator can put it in use with a feeling of complete safety.

The Trumble two-way tank valve has been developed as a precautionary device to prevent the operator from shutting in an oil and gas separator. The valve is so constructed that it cannot be completely closed off to both tanks at the same time. When the slide plate which controls the flow starts to move to close off one tank, it begins at the same time to open the other tank. As a result there is a time during the switching that it is open to both tanks, but at no time can it be completely closed to both.

## S. R. Bowen Company

### ROTARY RELEASING SPEAR

S. R. Bowen Company, Huntington Beach, California, is exhibiting a new rotary releasing spear which has already been put in use by many large operators. In addition to this the company is showing new rotary sockets and a removable sleeve type cathead as well as standard fishing tools.

The removable sleeve type cathead enables the operator to save the six to eight hours formerly required to remove an ordinary cathead and can be furnished at a cost slightly above what it formerly cost to build up the old cathead.

## ALCO OIL WELL TOOLS and EQUIPMENT

**4-Way Hard Formation Rotary Drilling Bits. Solid and Demountable Head Types**

**The new Roller Reamer and the regular Blade Reamer**

**Complete Coring Equipment for Hard and Soft Formations**

**Roller Underreamer**

**10,000-lb. Forged Steel Fittings - Crosses, Tees, Ells, Nipples, Swage Nipples, Flow Beans and Plain and Combination Flow Bean Cages**

**Kammerdiner Rotary Jar**

**Rotary Drill Pipe Float Valve**

**Releasing Rotary Spear**

**Rotary Table Guard**

**Automatic Weight Control**

**Mud Pump Pistons and Packing Sets**

# OIL EQUIPMENT & ENGINEERING EXPOSITION...

*"On to Los Angeles, Mid-Continent and Texas"*

**Welcome to the Exposition, March 16th to 23rd. Every minute will be packed with activity. — The newest equipment, tools and processes for the industry will be on view, and you will make many valuable business contacts. Be sure to see the green and gold Alco and Kammerdiner booth No. 61, one of the most complete exhibits of drilling tools and equipment in the show, with several tools that in a few months have aroused wide interest among oil men. In addition, you are cordially invited to be our guests at the newly enlarged Alco Plant where we will be glad to show you some interesting points in the making of Alco Tools.**

**Alco OIL TOOL CO. Inc.**

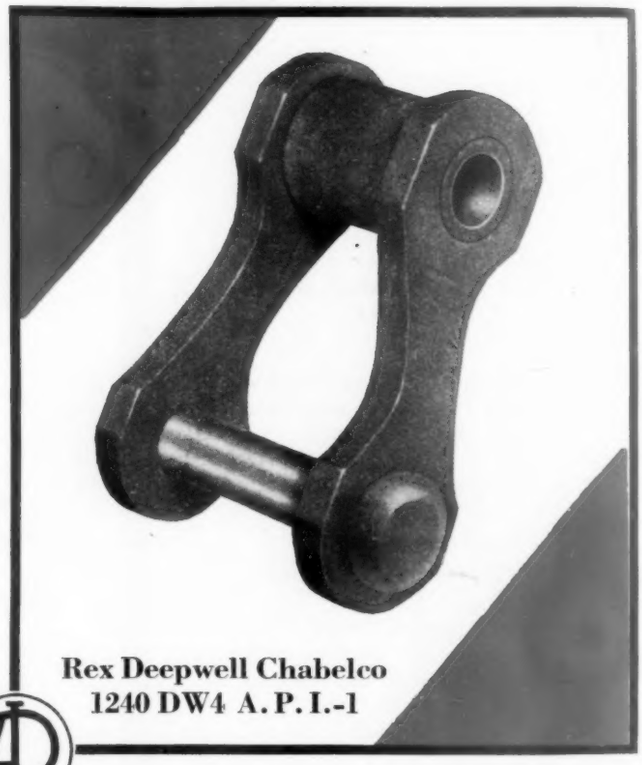
P. O. Box "A", Compton, California

Bakersfield—Maricopa—Ventura

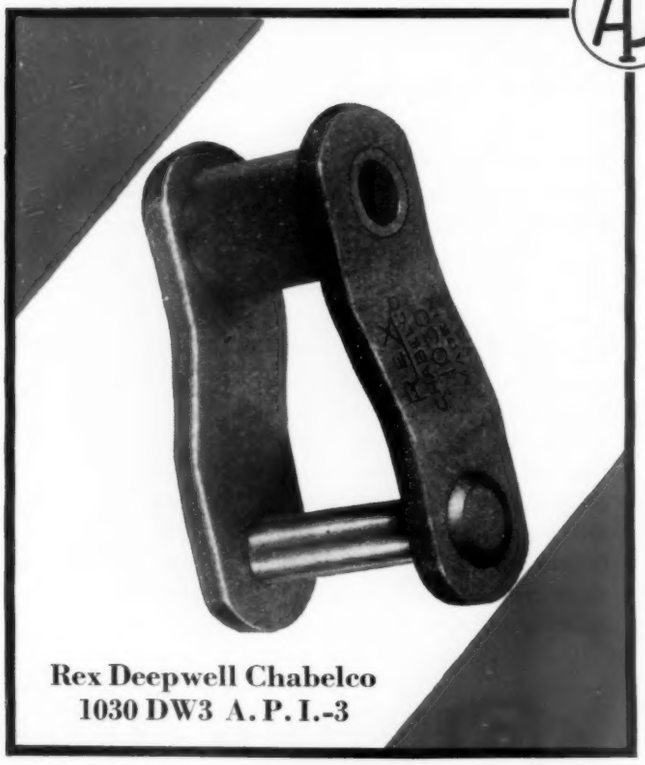
Houston TEXAS • Oklahoma City OKLAHOMA

# AN ANSWER TO EVERY CON

## IN THE GREATEST CHAIN THAT EVER HIT THE OIL FIELDS



Rex Deepwell Chabelco
1240 DW4 A. P. I.-1



Rex Deepwell Chabelco
1030 DW3 A. P. I.-3

### HIGH SPEED

Rex Deepwell Chabelco ground bushings and seamless alloy rollers give smooth action at high speeds.

### VIBRATION

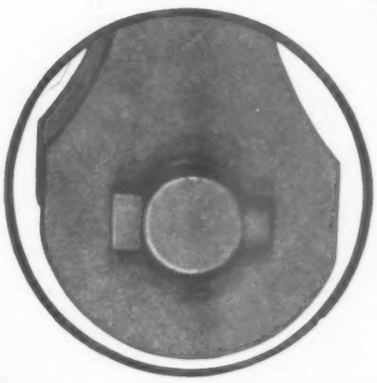
Uniform press fit of sidebars to bushings eliminates backing off of sidebars under vibration. The new Rex solid cotter, press fitted to the pin, stays in place.

*The Greatest Chain that*

REX DEEPWELL CHABELCO
Reg. U. S. Pat. Off.

CONCRETE MIXERS · PAVERS · PLASTER MIXERS · PUMPS · SAW RIGS · CHAIN · SPROCKETS

# DITION OF ROTARY DRILLING



The New Rex Solid Cotter

## STRENGTH

Alloy Sidebars
Nickel Alloy Pins
Seamless Bushings
Seamless Alloy Rollers

## HARDNESS

Heat-Treated Sidebars
Case-Hardened Pins
Heat-Treated Rollers
Case-Hardened Bushings

## PRECISION

Ground Pins
Ground Bushings
Close Tolerances
Broached Holes
Sidebars—Die Cut and Offset

**The new REX SOLID COTTER—cannot Rock; cannot Break; and stays in place.**

**—all combined into the UNIT LINK that Stays a Unit.**

## SUDDEN SHOCKS

**The heat-treated sidebars and alloy pins stand sudden shocks without yielding.**

## HEAVY LOADS

**The heat-treated sidebars stand the load and resist elongation.**

**The Rex Deepwell Chabelco 1030 DW3 is an A. P. I. No. 3 chain and the Rex Deepwell Chabelco 1240 DW4 is an A. P. I. No. 4.**

The Identification Mark of Rex Chabelco

***Ever Hit the Oil Fields***

**CHAIN BELT COMPANY, 739 Park Street, Milwaukee, Wis.** ***Stocks in All Active Oil Fields***

Cable Address: BELTCHAIN

1310 Second National Bank Bldg.
Houston, Texas

1414 Santa Fe Avenue
Los Angeles, California

BUCKETS · TRANSMISSION · ELEVATORS · CONVEYORS · TRAVELING WATER SCREENS

## Eclipse Lubricator Company, Inc.

**LUBRICATOR**

Eclipse Lubricator Company, Inc., Wichita Falls, Texas, is displaying its new Eclipse lubricator, for steam, gas and oil engines, steam pumps, air compressors, marine engines, Diesel engines, shaft bearings and for forcing treating chemicals into oil lines. This lubricator is so constructed that all parts are interchangeable except the reservoirs and drive shafts. They may be changed from right to left hand drive or vice versa by simply lifting out the drive shaft and reversing it. It is equipped with a sight feed, a heater attachment, and a hand crank attachment, which folds back out of the way when not in use.

## The Braun Corporation

**OIL CENTRIFUGE**

The Braun Corporation, Los Angeles, is showing the improved type Braun oil centrifuge which embodies important features which place it in the front rank of centrifugal machines designed for determining the water and b.s. content of oil. The improved Braun oil centrifuge employs a specially designed ball bearing motor, having no commutators, brushes, and similar devices ordinarily used, and consequently eliminates any possibility of arcing in the motor. The condenser is mounted in the control switch, which can be located at some distance from the motor, or in a location around which there are no explosive vapors which might ignite.

The motors are full ball bearing, in their construction, and are lubricated with a special high temperature long-life grease, which makes it unnecessary to lubricate on account of the intermittent service upon which they are called to operate.

The normal starting torque of the motors is such that there is a gradual and uniform acceleration, which eliminates all danger of breaking the glass tubes in the metal holders, and eliminates the quick starting, which has usually been found in the repulsion type motor. The motors are equipped with a canopy on the upper end and surrounding the shaft, closing all openings through which foreign particles might drop into the active parts and cause shorts or ground in the motor winding. Special ventilating features are incorporated in the construction of the motor, eliminating over heating. The improved type Braun oil centrifuge is a semi-enclosed type with heavy guard and cover, permanently fastened to the base of the machine.

The centrifuge is furnished complete as illustrated and includes a set of 4 x 100 ml. glass tubes, type No. 51525; height, 19 inches, diameter of guard 24 inches; net weight 115 pounds; shipping weight 200 pounds.

## Cleveland Brass Manufacturing Co.

**BARRETT ACIMET VALVES**

Cleveland Brass Manufacturing Company, Cleveland, is showing the complete line of Barrett Acimet acid-resisting valves, including the Globe, Angle, Freflo and Check types.

The body is of antimony lead; and a feature is the reinforcing ring, embedded in the body, and completely covered with lead, thus giving the strength to the seat. The lower stem has a steel shank, coated by special process with lead; and all parts

# American Hammered Piston Rings

***Endorsed and used as Factory Equipment by***

Ajax Iron Works - - - - Corry, Pa.
Atlas Diesel Co. - - - Oakland, Cal.
Bruce-Macbeth Eng. Co. - Cleveland, Ohio.
Bovaird & Seyfang Mfg. Co. Bradford, Pa.
Bradford Supply Co. - - Bradford, Pa.
Cooper Bessemer Corp., Mount Vernon, Ohio.
Chicago Pneumatic Tool Co., New York, N. Y.
Dow Pump & Engine Co. - Oakland, Cal.
Franklin Valveless Eng. Co. - Franklin, Pa.
I. P. M. and De La Vergne Machine Co. Philadelphia, Pa.
Ingersoll-Rand Co. - - New York, N. Y.
McIntosh & Seymour Corp. Auburn, N. Y.
Muncie Oil Engine Co. - Muncie, Ind.
National Supply Co. - - Toledo, Ohio.
Pennsylvania Pump & Compressor Co. Easton, Pa.
Power Mfg. Co. - - - Marion, Ohio.
Jos. Reid Gas Eng. Co. - Oil City, Pa.
Sullivan Machinery Co. Michigan City, Ind.
Titusville Iron Works - - Titusville, Pa.
Wilson Snyder Mfg. Co. - Pittsburgh, Pa.
Worthington Pump & Mach. Corp., New York, N. Y.

INNER SEAL RING
Patent No. 1,699,135

**The material consists of a uniform, close grained resilient cast iron, free from porosity and blow holes. The rings are individually cast so that the finished rings are free from unequal shrinkage strains, and with the graphitic carbon so distributed and proportioned as to produce an iron giving exceedingly long life to both cylinder liner and ring.**

**The molding and casting are done in our own up-to-date foundry, where all conditions are under the direct control of our competent metallurgists and foundrymen.**

***can be obtained in standard and oversizes from the above companies or their selling agents***

## The American Hammered Piston Ring Co.

BALTIMORE, MD.

*World's Largest Manufacturer of HAMMERED Piston Rings*

**BRANCHES**

**11 Moore Street, New York City** **501 Pico Street, Long Beach, California**
**215 Market Street, San Francisco** **826 E. First Street, Tulsa, Oklahoma** **7338 Woodward Avenue, Detroit**

SEE OUR EXHIBIT AT BOOTH NO. 311—CALIFORNIA OIL SHOW.

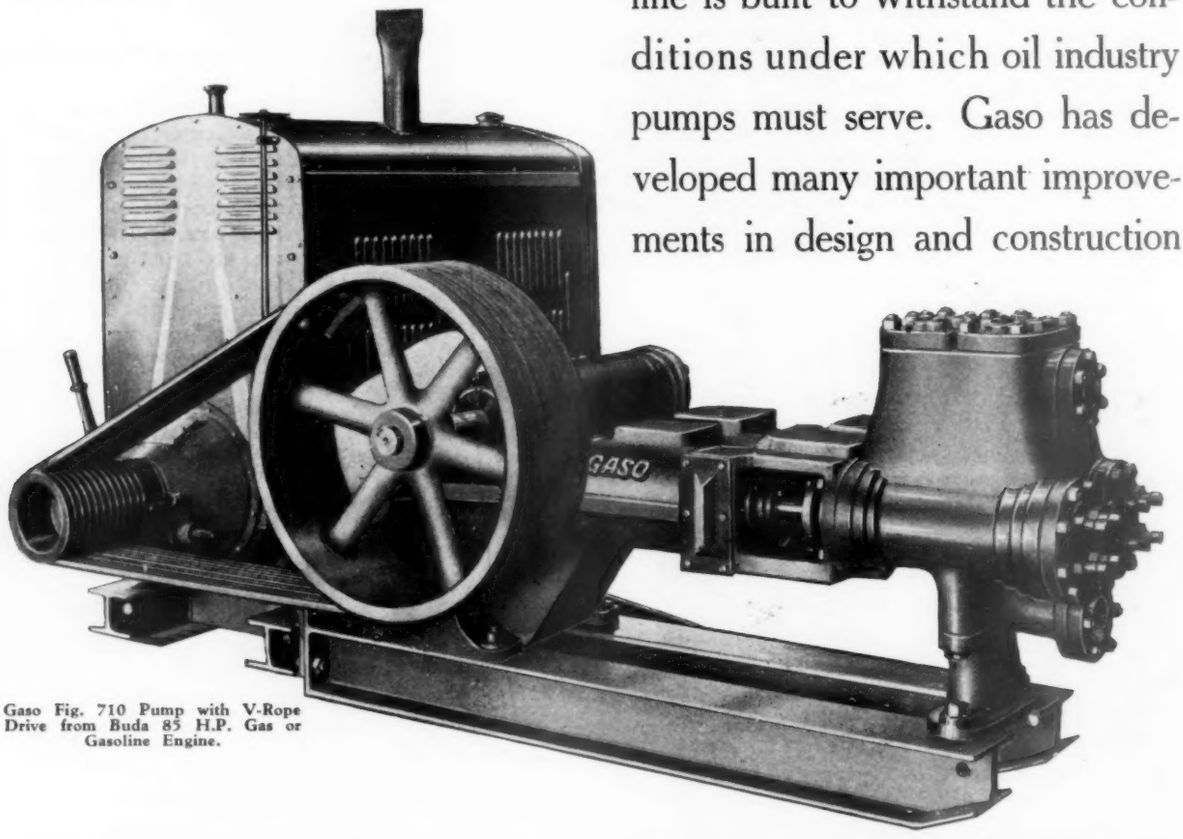
# Pumps for emergency and permanent.....

**GASO PORTABLE PUMPING UNIT**

***For Large Capacities and High Pressures***

**This unit, consisting of the Gaso Fig. 710 Enclosed Power Pump, with V-Rope drive from a Buda 85 H.P. Gas or Gasoline Engine, is mounted on H-beam skids for easy transportabili y. Interchangeable liner fluid end gives capacities from 54 barrels per hour at 1400 pounds working pressure to 502 barrels per hour at 300 pounds pressure. All working parts running in an oil bath — TIMKEN TAPER ROLLER BEARINGS on pinion shaft—babbitt lined main bearings—continuous tooth herringbone gears—are factors in high efficiency and durability.**

FOR every pipe line pumping requirement there is Gaso pumping equipment of the ideal type. And each pump in the Gaso line is built to withstand the conditions under which oil industry pumps must serve. Gaso has developed many important improvements in design and construction




**Gaso Fig. 710 Pump with V-Rope Drive from Buda 85 H.P. Gas or Gasoline Engine.**

GASO OIL INDU

# .....semi-permanent... pipe line service

which insure longer service at minimum cost for operation and upkeep.

**GASO PUMP & BURNER MFG. CO.**

TULSA, OKLA.

Ft. Worth, Tex. New York, N.Y.

Gaso Fig. 2010-W Portable Pumping Plant

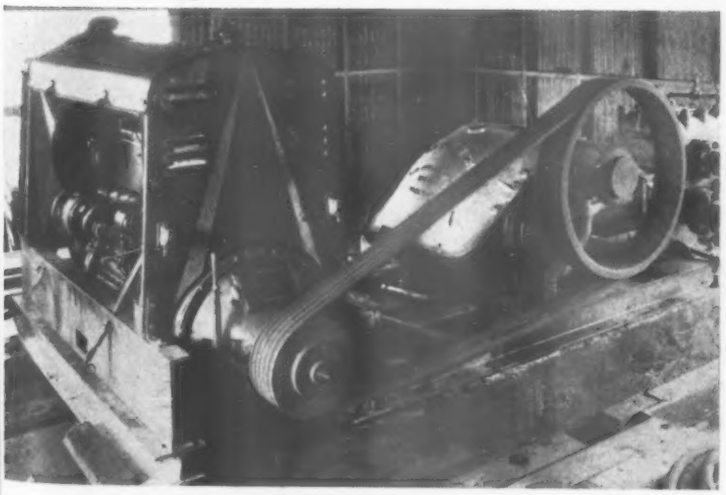
**GASO PORTABLE PUMPING PLANTS**
**Fig. 2010-W**

*For Emergency and Semi-Permanent Service*

These are ideal for pick-up in case of line breaks, or for any other emergency service. This unit has a heavily constructed duplex, double acting power pump, with worm drive direct from a Buda 50 H.P. gas or gasoline engine.

Has bronze ring gear and steel worm, with double thrust ball bearings, enclosed and running in oil. Mounted on sturdy TIMKEN TAPER ROLLER BEARING Trailer which can be transported at regular truck speed.

Interchangeable cylinder liners give capacities ranging from 45 barrels per hour at 800 pounds pressure to 250 barrels per hour at 275 pounds pressure.



Gaso Fig. 1508 Pump with V-Rope Drive from Buda 50 H.P. Gas or Gasoline Engine.

**GASO ALL TIMKEN BEARING PUMP, Fig. 1508**

This is an extremely efficient and durable pump for oil and water service up to 800 pounds working pressure. Crank case is enclosed, with all working parts running in an oil bath. The pinion and main bearings are TIMKEN TAPER ROLLER BEARINGS, and the gear is solid Herringbone construction, mounted in center on steel crank shaft. This pump may be arranged for any type drive. Rated at 63 to 250 barrels per hour at 800 to 250 pounds working pressure.

STRY PUMPS

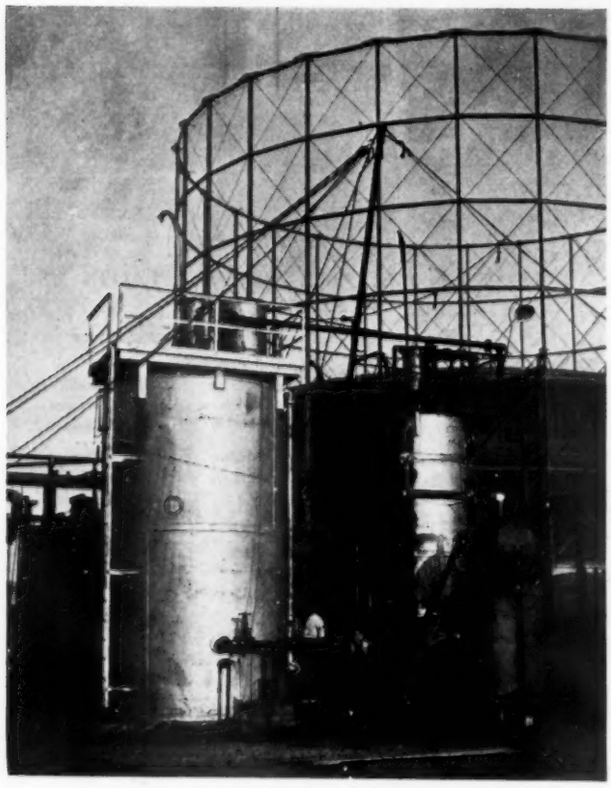
of this valve that come in contact with the acid, are made of lead. The upper stem is of bronze, connected to the lower stem by a swivel. The resulting action is that the lower stem works on the principle of a plunger. The packing glands carry a special pure gum rubber washer designed to be impervious to acids. Representatives on the coast are the Jones-Lyman and Company.

## Southwestern Engineering Corporation

### CAGE DEHYDRATOR

Southwestern Engineernig Corporation, Los Angeles, sole agents and manufacturers for the new Cage dehydration process, is showing samples taken from a Cage dehydrator operation.

The process is an electrical one, entirely new in principle and in results obtained. No electrical current passes through the oil, only one electrode being used, the procedure consisting of a high tension charge impressed on the oil. This new dehydrating method is by no means untried as to practical application. No chemicals are used in the Cage method of demulsification and due to the fact that it is only necessary to charge the electrode and surrounding water particles, the power consumption is exceedingly low.

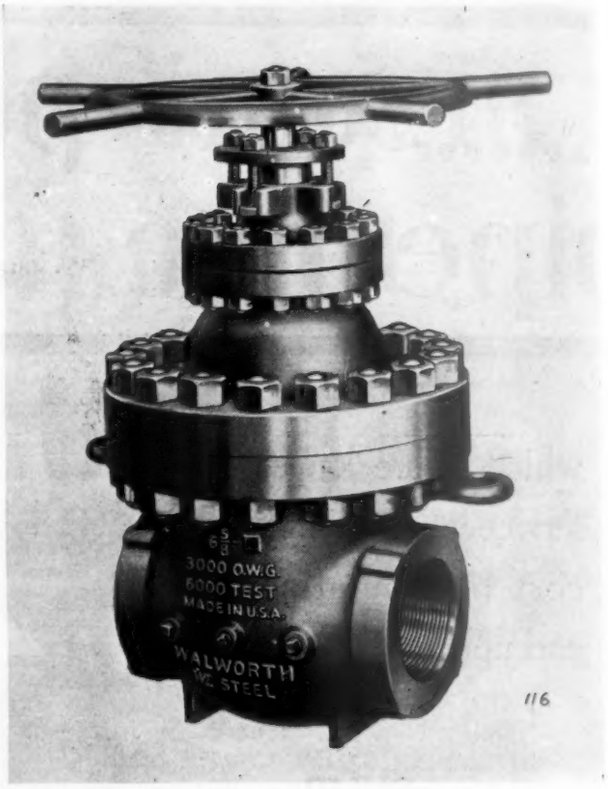


## Walworth Company

### VALVES

Walworth Company, Boston, is showing its new line of Sigma steel drilling gate and line valves and christmas tree fittings. The valves cover pressure ranges from 500 to 30,000 pounds working pressure and are available for all casing sizes. The hand wheels are of a new "Tiller" type with protruding spokes, which make for ease in opening and closing the valves. They are painted a brilliant red, while the valve bodies are painted dark green.

Walworth Company has had Sigma steel on the market




for several years for high-pressure, high-temperature service, but the line of Sigma steel valves for top-of-the-well service is entirely new. It was brought out with the special view of offering a new factor of safety at a point in oil production operation where proper control has always been a difficult problem.

The display also will include iron body gate valves, bronze valves for refinery and production plants, Walworth master Stillson wrenches, chrome-nickel-iron pipe and complete line of oil malleable fittings and Sigma steel fittings.

## The Foxboro Company

### HIGH PRESSURE METER

Foxboro Company, Foxboro, Massachusetts, is exhibiting its high pressure meter and its flow ratio recorder.

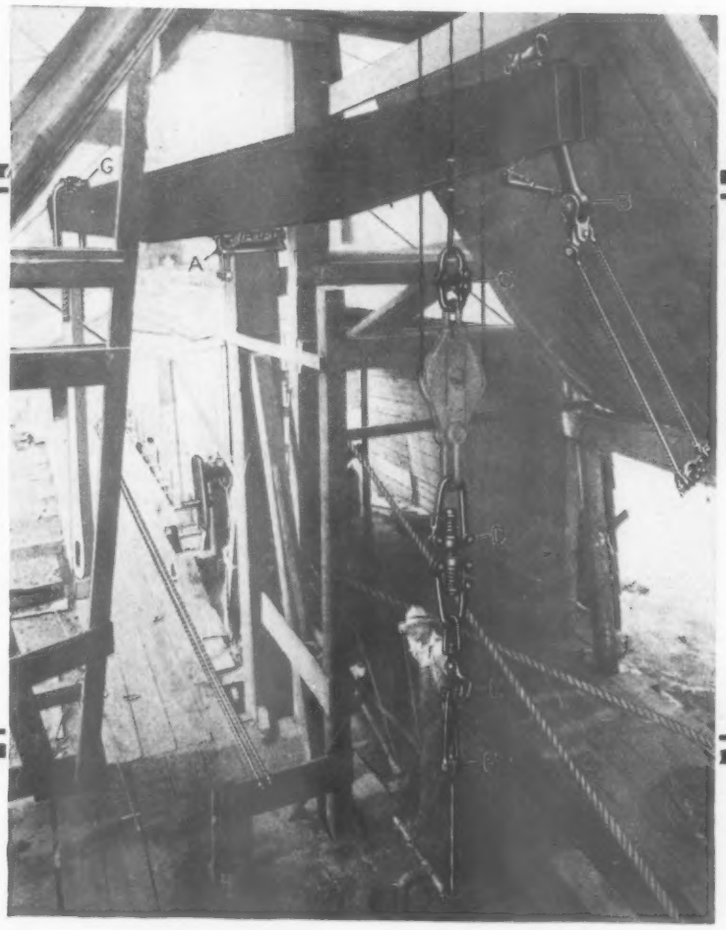
The high pressure meter is guaranteed to withstand a working pressure of 5000 pounds per square inch, and is built for measuring the flow of gas, air, steam, hot oil and gasoline. All working parts subjected to pressure are drop forgings, and every part is specially designed for high pressure work. All known errors and variables have been eliminated, and the new meter has no unknown quantities and no inherent defects it is calibrated to read and record in terms of flow and may be equipped with an integrator that reads direct without multipliers, the total flow in gallons for feet or pounds.

### FLOW RATIO RECORDER-CONTROLLER

The flow ratio recorder-controller combines the sturdy, accurate features of the Foxboro flow meter with the close control features of the Foxboro flow controller. It is two instruments in one, so connected that the rate of flow of one fluid as measured by the flow meter, controls the rate of flow of the second fluid. It constantly real-

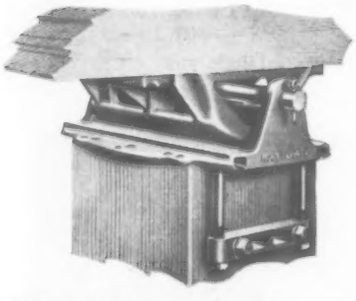
# *Advance with* RATIGAN

Introducing the new SAFETY SYSTEM of well pulling, made possible and practical through the use of the Ratigan No. 12 Pivoting Walking Beam Rocker. It has been adopted as standard equipment by six major operating companies in the United States.




Without adjustment to the Rocker in any way—the Beam can be swung around six feet from center — thus completely clearing the well ceiling and walk, as illustrated. Proven through four years of successful service.

Above well as equipped, includes: "A" No. 12 Pivoting Walking Beam Rocker—"B" No. 24-A Oil Bath Beam Hanger Combination—"C" No. 14 "C" Link—"D" No. 31 Spring Swivel Tubing Link—"E" No. 27 Safety Sucker Rod Hook—"F" No. 45 Ball Bearing Safety Sucker Rod Elevator—"G" No. 39 Pitman Stirrup Bearing.



View showing construction of Rocker. Easy to install—no friction — no lubrication — extremely long life — reasonable in price. Write for Bulletin No. 11.

Write for Bulletins describing any or all of the above Ratigan equipment.

## J. P. RATIGAN

MANUFACTURER

1213 Santa Fe Avenue, Los Angeles, Calif., U.S.A.

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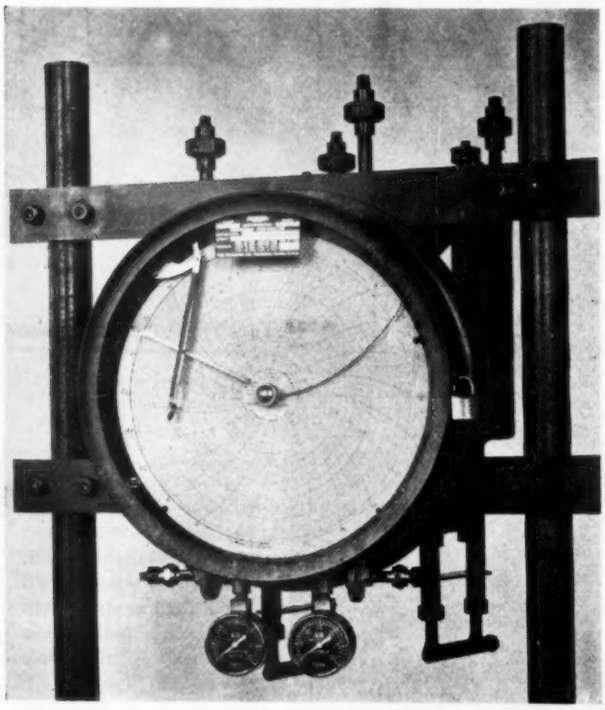


justs the control point of the flow controller, thus keeping the two fluids in the desired proportions. It may also be used to control the ratio of steam to fat-oil, in the steam still.

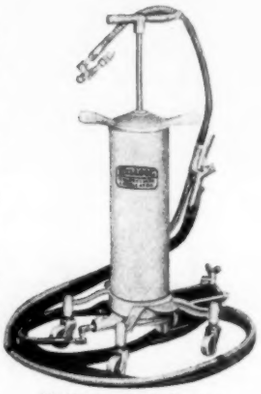
## Kellogg Manufacturing Company

Kellogg Manufacturing Company, Rochester, New York, is displaying its Model EM-3322-E compressor, Model 20-S lubricator, and Model 350 "master lubricator."

*Kellogg Compressor*

The compressor is of all steel welded construction of tank and platform, with "V" belt drive with short centers, copper-coil after cooler, pump feed lubrication, honed cylinders and leak proof rings. The model on display is a two-stage compressor, using a three-horsepower motor, and has a displacement of 16 cubic feet per minute.

The lubricator is a portable, air-operated outfit, with a capacity of 20 pounds of grease; and is capable of delivering this grease under pressure up to 6000 pounds per square inch. It is operated by means of an air compressor.



*Kellogg Lubricator*

The "master lubricator" is intended for greasing stations with three or more pits, racks or lifts, and is designed for permanent installation. It is automatic in operation, maintaining constant pressure on the pipe lines, the motor starting automatically when the pressure drops, due to use of any of the outlets in greasing car fittings.

## Mine Safety Appliances Company

### SAFETY EQUIPMENT FOR OIL INDUSTRY

Mine Safety Appliances Company, Pittsburgh, is displaying a complete line of safety equipment for oil field and refinery use. Featuring the display is a complete line of respiratory protective equipment and first aid materials, including improved types of tank gaugers' masks for protection against hydrogen sulphide gas from sour crudes and distillates. Two designs of tank gaugers' masks, employing GMC-S supersize canisters, are being shown — the type "C" mask with a single inhalation tube, which fits under the arm, and the type "D" mask with double inhalation tubes, which fall over the shoulders, leaving the chest and arms entirely free. Both of these masks which are of the canister (chemical) type have been improved in design and now are officially approved by the United States government for respiratory protection against deadly hydrogen sulphide gas.

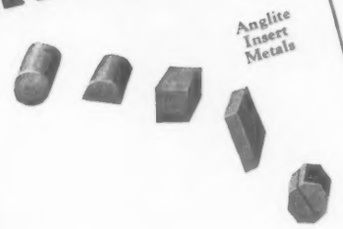
*Tank gauger's mask*

This company is also displaying the improved M-S-A combination hose mask — a fresh air mask for use in entering high concentrations of gas and oxygen deficient atmospheres. The M-S-A combination hose mask is the

*24-Unit first aid kit*

# A GOOD PAIR TO DRAW TO!

## ANGLITE



*Every Angle a Cutting Edge*

## National

CASING PROTECTORS

## BOTH RESIST WEAR!

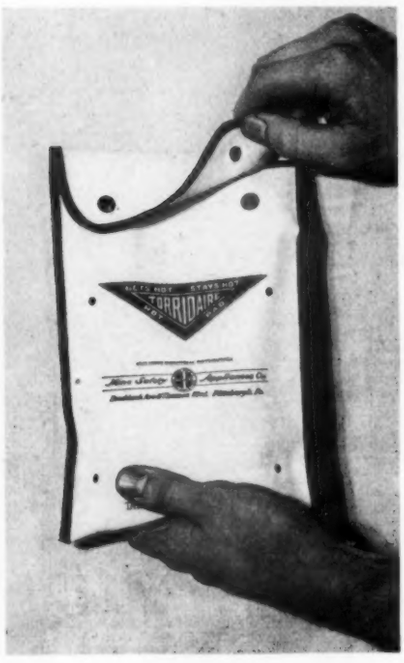
Anglite—the Super-Diamond-Sub Insert Metal—is available in six different types; round, half-round, square, flat, octagonal and tube (crushed). There is not a diamond-sub drilling bit demand that cannot be met with one of these six types. Anglite insures maximum footage at minimum cost.

National Casing Protectors hold the drill pipe away from the casing and keep the pipe centered in the hole. They provide maximum protection and wear resistance and tend to eliminate twistoffs, fishing jobs, collapsed casing, and thin tool joints and collars. Easy to install and they stay where put.

*Write for illustrated catalogs containing complete information*

National
TOOL & METALS, INC.
DIVISION
GLOBE OIL TOOLS CO.
Los Nietos, Calif.

only fresh air mask officially approved by both the United States Bureau of Mines and the American Gas Association. It is widely used when men are cleaning out tank cars, oil tanks, etc., the wearer being furnished with cool, fresh air from the outside.



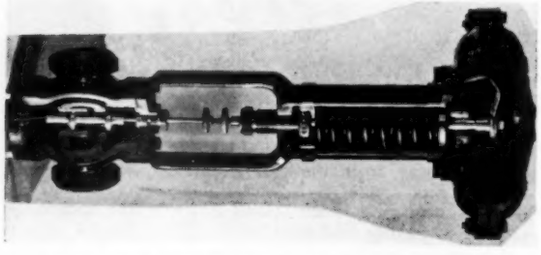

*Torridaire hot pad*

Another new line of equipment is the "Type D" system of first aid kits and refills. Individual dressings are boxed in various "unit sized" packages and the kits are available in five standard sizes with either waterproof or heavy duty cases.

The Torridaire hot pad, with a new wool cover, is also being displayed. This pad replaces the troublesome hot water bottle and furnishes heat in two minutes time, entirely independent of hot water, gas and electricity. It is a splendid emergency hot pad for rendering first aid treatment in the field.

The exhibit is in charge of H. E. Munn, manager of the pacific Coast branch and warehouse of the Mine Safety Appliances Company, 318 East Third Street, Los Angeles.

## Neilan, Shumacher & Company



### AUTOMATIC CONTROL EQUIPMENT

Neilan, Schumacher & Company, Los Angeles, is displaying a full line of Neilan automatic equipment, consisting of all regular Neilan control devices. A feature is the Neilans ball-bearing reducing regulator, with a section cut away exposing the interior.

## Kerotest Manufacturing Company

### VALVES AND OIL SAVER

Kerotest Manufacturing Company, Pittsburgh, is showing a complete line of oil field valves and fittings, together with a complete line of refinery valves.

The Kerotest high-pressure oil saver will also be shown. This is a comparatively new development, which has won much favor during the past year.

## E. M. Smith Company

### EMSCO FREE-CIRCULATION PROTECTOR

In the "Emsco Free-Circulation Protector," the E. M. Smith Company, Los Angeles, has developed a tough rubber casing protector embodying the features of previous types, plus many new and improved features exclusively Emsco.

The Emsco protector rubbers are made flat, in shallow molds, and cured in the flat position under 200-tons hydraulic pressure. At no time, during process of manufacture, while being installed, or while in service, are Emsco rubbers expanded.

The tough rubber offsets or "bumpers" are integral parts of the flat body, and when the protector is placed in the pipe the rubber is still in a flat position. A steel cage, with perforations through which the rubber offsets protrude, holds the protector firmly in place on the pipe to protect it from damage by irregularities in the hole.

It is designed to not restrict circulation, because the circulation space provided is greater than the volume of fluid forced through the rotary hose; to obtain a firm grip on the pipe and not slip up or down, pile, nor overlap; to be installed quickly without the use of heavy or intricate accessories; to be easily removed from the pipe when pulled out, thereby allowing full salvage value; and to be light in weight, making the protectors easier to handle and adding less weight to the string.

Emsco free-circulation protectors are made to fit all standard sizes of drill pipe. Complete information will be supplied upon request to E. M. Smith Company, Los Angeles.

## The Thrift Corporation and The Hydraulic Equipment Corporation

### HYDRAULIC SCREEN CLEANER

The Thrift Corporation and the Hydraulic Equipment Corporation, Houston, are showing their hydraulic screen cleaner and hydraulic set whipstock.

The hydraulic screen cleaner is a divice for cleaning bottom well screen to allow an increased production in wells in which screen has become polluted from long service or unusual pressure. It is run on a string of tubing to the top of the screen and suspended at the bottom of the tubing. When the top of the screen is reached it is lowered about 18 inches down in the screen. Pressure from a slush pump or hydraulic pump is then applied, the pressure thus exerted offering the tendency to cause both rubber packer

HAYSTELLITE

*The cast tungsten carbide*

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# TELL THE STORY...
# *TRY IT!*

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*Unit of Union Carbide and Carbon Corporation*

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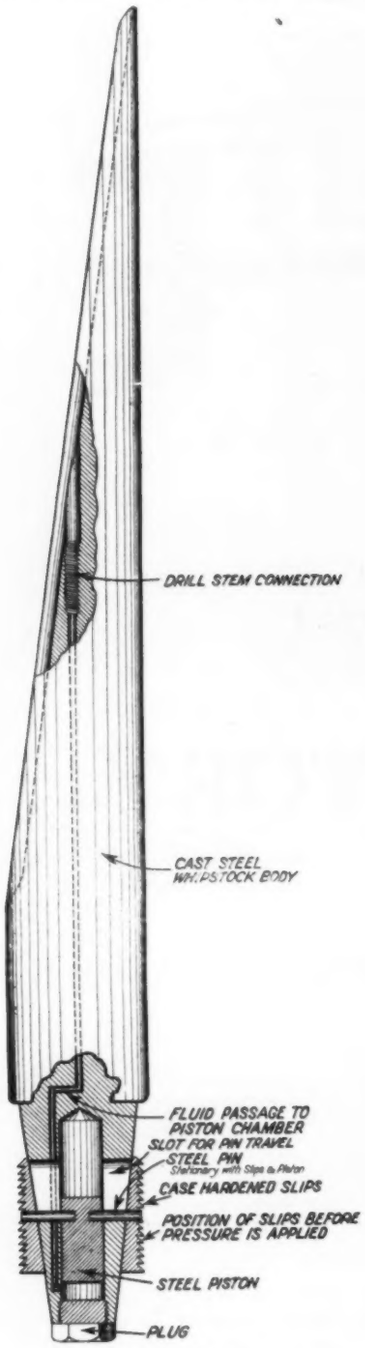
to set against the inside walls of the screen. Fluid used may be oil, water, hot oil or chemicals.




*Hydraulic Whipstock*

### HYDRAULIC SET WHIPSTOCK

The new hydraulic whipstock is designed to provide a device that can be set in a well at any desired depth on a drill stem and without the necessity of filling up below the point of sidetracking. It is lowered into the hole attached to a drill stem, with the left hand tread in the body of the whipstock, to a point where it is desired to mill out the casing. Pressure is then exerted by a slush pump, which causes the slips attached to lower the body of the whipstock to move upward against the sides of the casing and set whipstock. The drill stem is then withdrawn by rotating to the right until the stem unscrews from the body of the whipstock. Teeth in the slips are machined both horizontal and vertical to prevent slipping or turning.

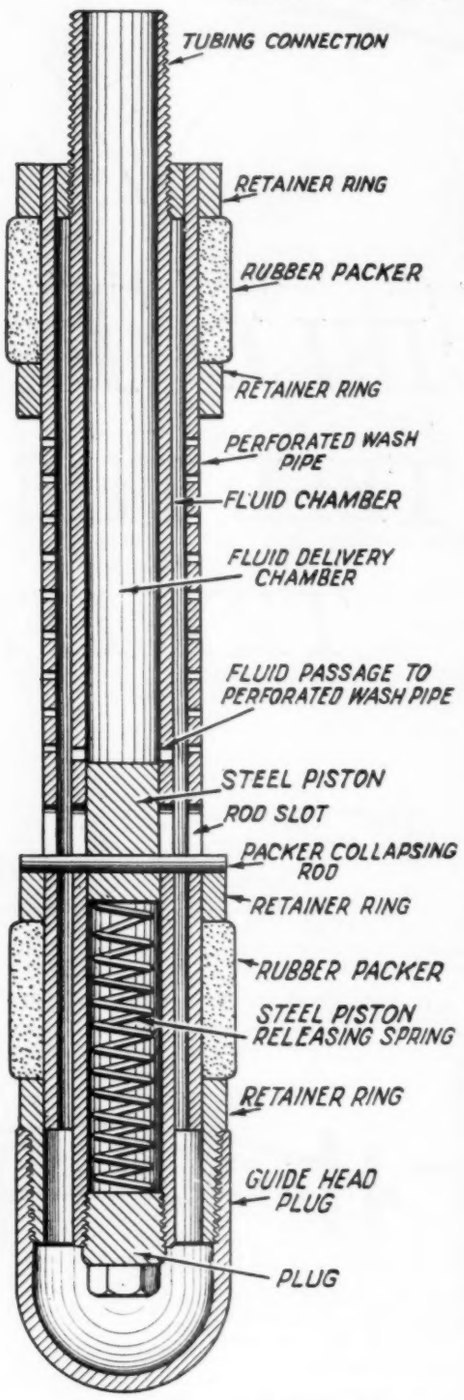
## Rodless Pump Company

### DRILL PIPE CONTROL VALVE
### BLOWOUT PREVENTER
### HYDRAULIC GRAB

Rodless Pump Company, Los Angeles, is showing a drill pipe control valve, a blowout preventer, and a hydraulic grab.

The drill pipe control valve is so designed that the valve mechanism can either be situated within the box member of any make of tool joint, or the device can be installed as an intermediate unit between the two members of the tool joint assembly. While drilling is in progress, the valves are held open by the tool joint pins, not being affected by pressures either from above or below the valve positions.

The blowout preventer is designed to seal off high pres-




*Hydraulic Screen Cleaning Device*

*Drill Pipe Control Valve*

# EXPERIENCE

*"There is no substitute for* **EXPERIENCE"**

# BORIUM

## Mounted Bits

...ve been making more hole—consist-...tly—than any other insert material, since the advent of Diamond Substitutes. Experience has taught the driller that.

It has been wisely said that "Experience is a dear teacher"—so why not profit by the experience of others and use Borium on your hard-formation bits from now on.

*"There is no Substitute for BORIUM."*

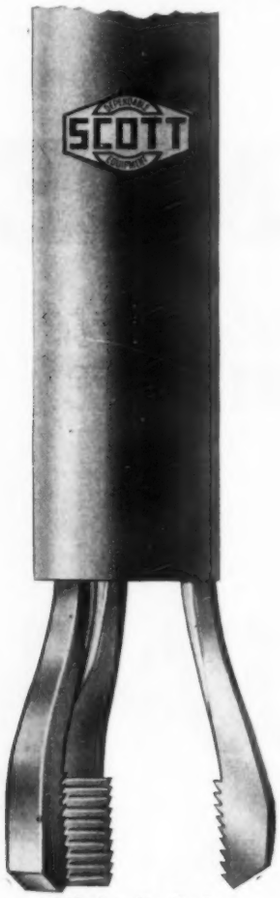
Write for the booklet describing . . . BORIUM. It will pay you!

● *The Borium mounted bit pictured here made 27 feet of hole, where other hard-formation bits made but two feet—in the same formation, below the 5,000-foot level.*

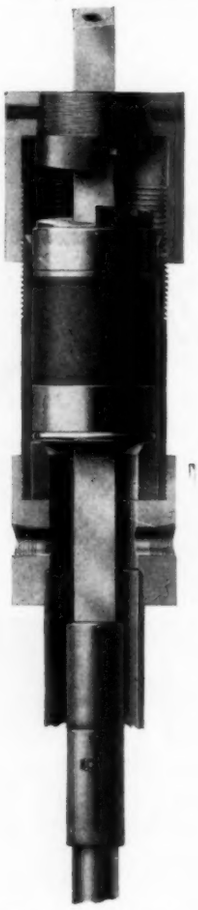
## STOODY COMPANY

Manufacturers of **Welding Rod Alloy Steels** Equipment

WHITTIER CALIFORNIA




*Hydraulic Grab*



*Blowout Precenter*

sures in wells, and to effect the seal in such a manner that the power transmitted from the prime mover through the line shaft is automatically applied for the purpose of tightening the packing rubber in the upper unit, while steam pressure from the boilers is utilized as a power medium to engage the packing around the drill pipe.

The hydraulic grab is equipped with three separate lower bowls, which, when in position, screw onto the lower tread of the hydraulic piston cylinder. One bowl is slotted to take the two-arm assembly, the second being slotted to accommodate the three arms of the basket, while the third contains a conically bored seat for the combination socket slips.

## Commercial Iron Works

### ORIFICE FITTING

Commercial Iron Works, Los Angeles, is displaying "Commercial" orifice fitting, representing the culmination of years of research and study of orifice fitting operation. It is characterized by: a plate clamping mechanism, designed to avoid wraping; a multiple-thread elevator which lifts the orifice quickly from seat to upper chamber; a lubricant sealed valve; tight orifice plates; safety to operator is assured by use of bleeder valve to reduce chamber pressure before releasing bonnet; no packing of set screws required as none enters pressure areas; and the assurance of centering by means of guide templates and control mechanism.

## E. B. Wiggins Oil Tool Company

### DISC BIT

E. B. Wiggins Oil Tool Company, Los Angeles, is displaying its new disc bit and hose coupling assembly press. The new bit is a simplified roller bearing bit, built to make hole without danger of balling up, running disc flat, leaving parts in hole, or leaving a core. Instead of each disc and its bearing and holding parts being fastened to one leg of the shank, both discs are mounted on a central bridge, or yoke. The discs are mounted on roller bearing and are held on the yoke by the washers, which are fastened to the yoke by screws. The yoke assembly units contain all the wearing parts and can be kept assembled in the field at all times.

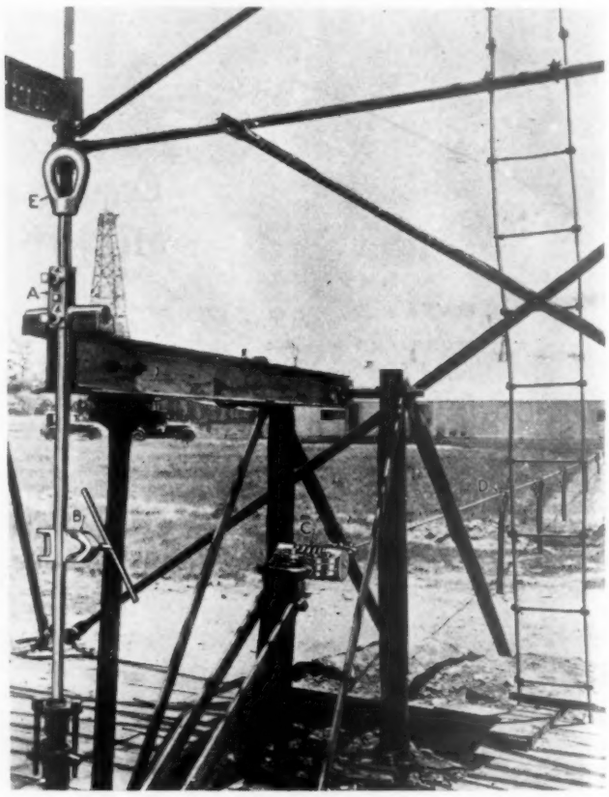
### WIGGINS CONNECTOR PRESS

The Wiggins connector press is a light-weight screw press which can be handled easily by one man in a warehouse, on a tool rack, or in an oil rig. It is designed to eliminate the driving of nipples into hose and reduce the work of coupling hose on rigs from a matter of hours to a few moments. Connectors can be forced into tight hose easily and without cutting or injuring the hose.

## J. P. Ratigan

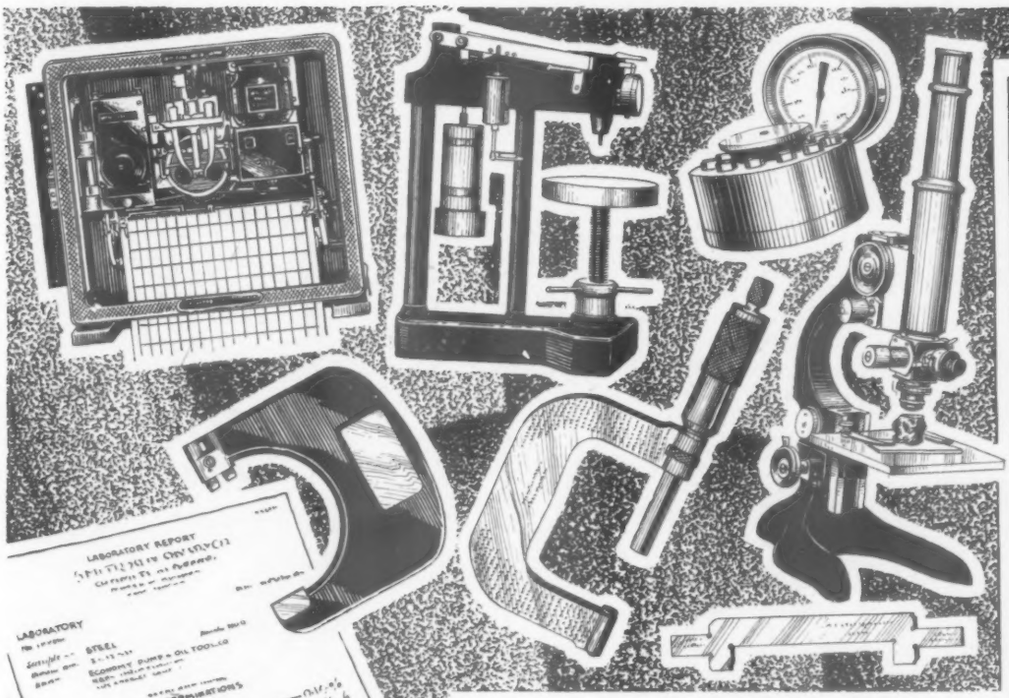
### FIELD ACCESSORIES

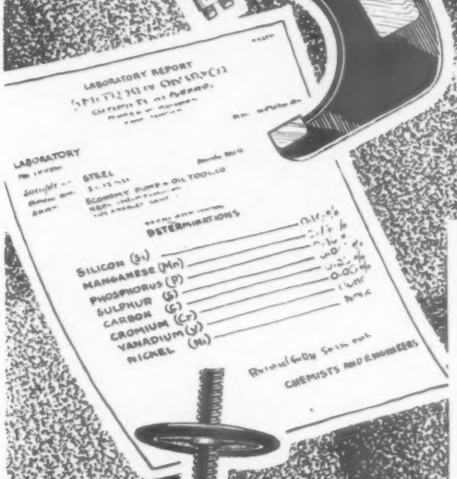
J. P. Ratigan, Los Angeles, is showing the N. 39 Pitman stirrup bearing, the new Ratigan universal oil bath hanger combination, the No. 42 Ratigan beam hanger, and a full line of field accessories including, a reversible polish rod grip (A), spacing clamp (B), shock absorber (C), pull rod line rollers (D), and polish rod lifting eye (E).

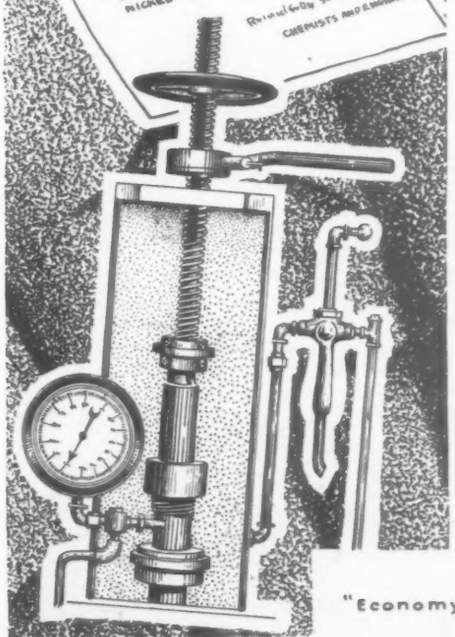



### BEAM HANGER

The Ratigan beam hanger has a bearing floating in a bath of oil which needs replenishing only at intervals. It





# INTRODUCING SOME EPCO PUMP PARTS

## Which are just as vital as the balls-and-seats or the barrel tube

Careful analyses of steel....miscroscopic examinations....hardness tests....and other rigid tests and inspections are the ***invisible*** parts of an EPCO Pump which insure continued performance—the sort which has made the

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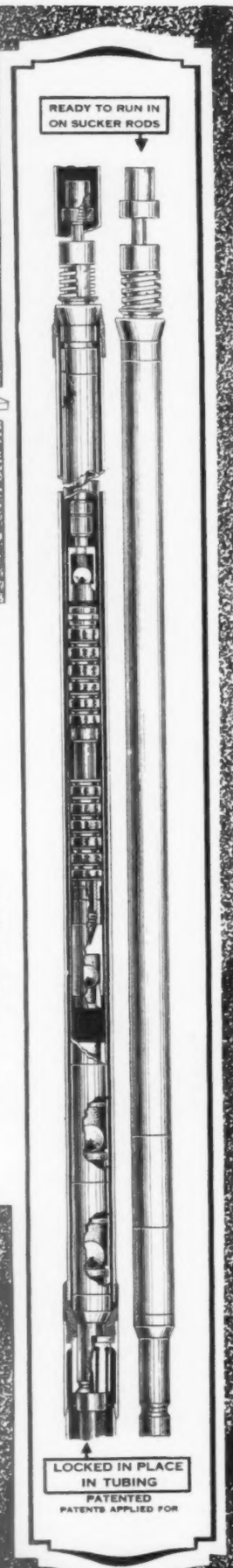
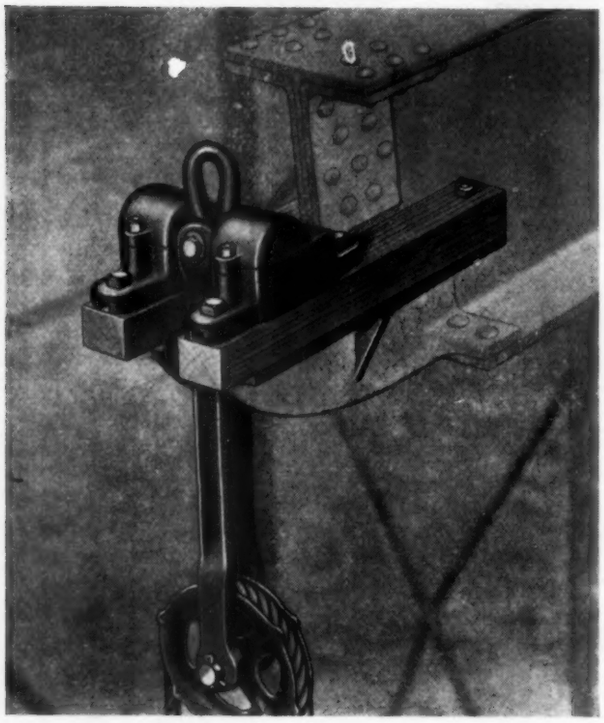
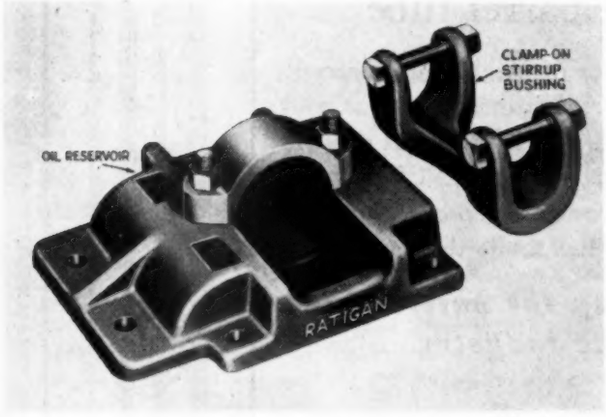




*Ratigan Beam Hanger*

is easily installed, and has a self-adjusting joint at the top which permits the hanger to line up with the stuffing box as soon as the weight of the well is placed on it.



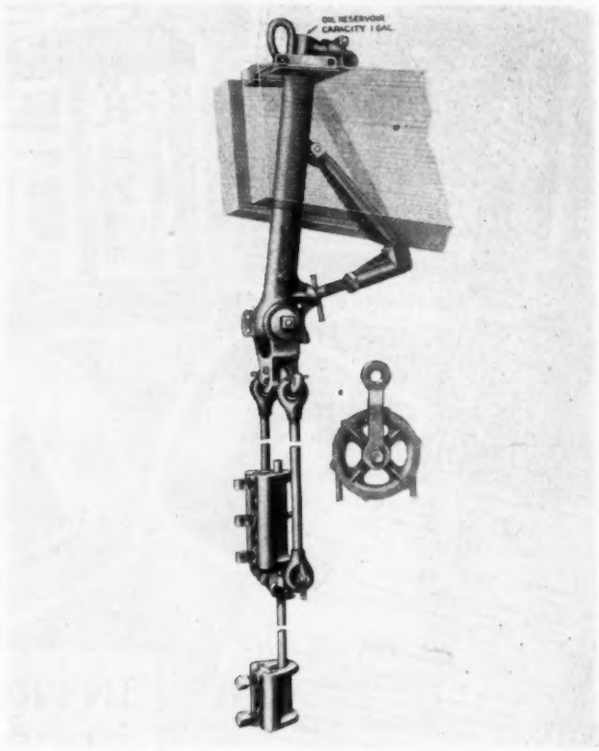

*Ratigan Pitman Stirrup Bearing*

### STIRRUP BEARING

The No. 39 Pitman stirrup bearing contains an oil reservoir which keeps it constantly lubricated, and which is quickly and easily installed.

### OIL BATH BEAM HANGER

The Ratigan universal oil bath beam hanger combination is designed for deep well drilling, and includes the Ratigan hanger, carrier bar, and hanger rod and eyes, all tested for 100,000 pounds capacity. The sheave wheel shown in the accompanying illustration is optional equipment for wire lines. The hanger stem contains an oil reservoir of one gallon capacity with gravity feed to the phosphor bronze bearing which floats in oil.



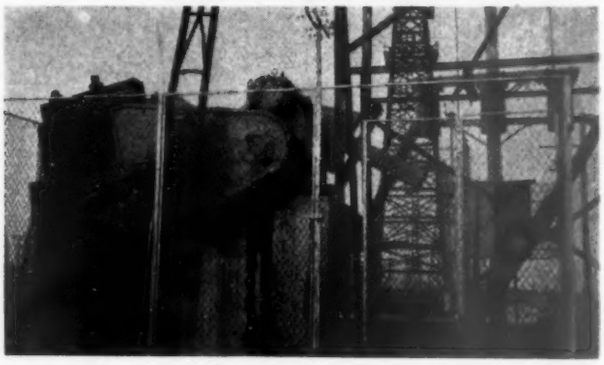

*Ratigan Universal Oil Bath Beam Hanger*

## A. H. Pier Company and Lincoln Electric Company

### "STABLE-ARC" WELDERS

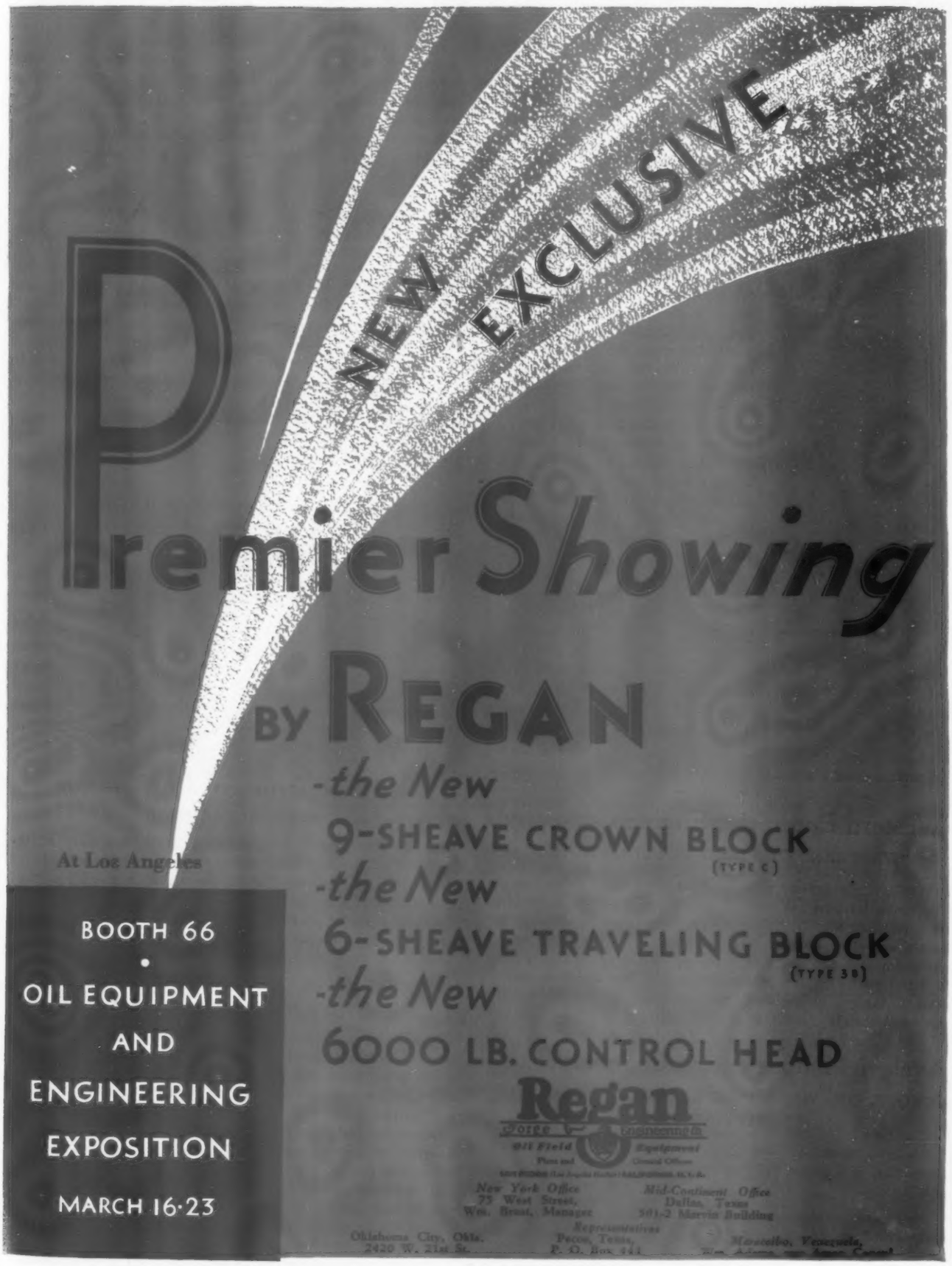
A. H. Pier Company, Los Angeles, and the Lincoln Electric Company, Cleveland, are showing several different types of Lincoln 'stable-arc' welders, one of which is in operation to demonstrate the uses of arc welding. The new Fleetwood process is being shown.

## Pacific Gear & Tool Works, Inc.



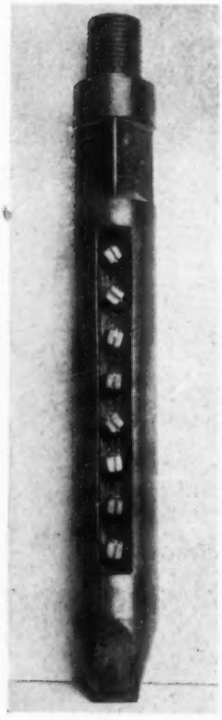
### INDIVIDUAL PUMPING UNIT

Pacific Gear & Tool Works, Inc., Los Angeles, is displaying its new individual pumping unit, a special feature of which is the counterbalancing. An auxiliary balance has been added to the standard pumping unit, which rotates at twice the speed of the main crank balance, and is so timed that it absorbs energy from the motor during


NEW
EXCLUSIVE
Premier Showing
BY REGAN
-the New
9-SHEAVE CROWN BLOCK
(TYPE C)
-the New
6-SHEAVE TRAVELING BLOCK
(TYPE 30)
-the New
6000 LB. CONTROL HEAD
At Los Angeles
BOOTH 66
•
OIL EQUIPMENT
AND
ENGINEERING
EXPOSITION
MARCH 16-23
Regan
Forge & Engineering Co.
Oil Field Equipment
New York Office
75 West Street,
Wm. Brust, Manager
Mid-Continent Office
Dallas, Texas
501-2 Marvin Building
Representatives
Oklahoma City, Okla.
2420 W. 21st St.
Pecos, Texas
P. O. Box 341
Maracaibo, Venezuela

the two minimum load points of the pumping cycle, and gives up energy at the maximum load points. This results in a more nearly constant angular velocity of the crank pin, and a more nearly flat motor power curve.

## Martin-Decker Corporation



### TEMPERATURE BOMB

Martin - Decker Corporation, Long Beach, is displaying the Martin-Decker temperature bomb, Martin - Decker dynamometer, the Martin-Decker well indicator, and the Martin-Decker "tool pusher" model of the weight indicator vernier.

Advantages claimed for the temperature bomb, are its handling qualities, since it can be run into the hole or out without particular care; the fact that the readings of the instrument are not affected by well operations; and that the temperature is definitely ascertained, as the record can not be destroyed or changed through impacts and jarring while coming out of the hole.

The weight indicator, which registers small load variations, combines in one unit a standard weight indicator diaphragm and a special vernier gage mounted upon it. It may be quickly clamped on the dead line of an ordinary indicator diaphragm whenever careful drilling, fishing, milling, tapping, whipstocking, or any other operation which requires a more sensitive gage than that of the standard weight indicator, is desired.

Two new additions to the Martin-Decker line being exhibited at the show, are the line spooler, and the new automatic mud scales.

## Western Enterprise Engine Company

### "WESTERN" OILFIELD PULLING HOIST

Western Enterprise Engine Company, Los Angeles, is displaying its new "Western" oilfield pulling hoist mounted on caterpillar tractor No. 60, with three transmissions. The hoists are steel throughout. All gears are machined with cut teeth and the drum is made of cast steel. The drum is fitted with Timken roller bearings. The hoist is operated through bank control, hand operated brakes and hand operated clutch.

## Axelson Manufacturing Company, Ltd.

### GAUGES, OIL WELL PUMPS, SUCKER RODS AND FITTINGS

Axelson Manufacturing Co., Ltd., is featuring its complete line of gauges, oil well pumps, sucker rods, lathes and fittings.

Two feature attractions are the projection of motion pictures. One of the pictures will portray the development, refining and distribution of oil in all its phases, which will give intimate knowledge of the various stages of petroleum development from the time the geological formation was determined until the oil in ultimately used in the motor car. The second film demonstrates the many intricate processes required in the manufacture of various Axelson products.

Every type of pump assembly manufactured by Axelson is on exhibit in full size and in minature, and working demonstrations have been arranged. The Axelson exhibit will also mark the initial showing of the new Gill long stroke, which is installed on the end of a walking beam and demonstrates the feasibility of using a long stroke at a considerable saving of power and with an increase in pumping efficiency.

The gauge division has prepared a complete line of Standard, U. S. and S. A .E. thread gauges, as well as A. P. I. gauges; also plain cylindrical gauges and high-speed steel-ground taps.

The Axelson Lathe Division is showing an 18-inch direct-connected heavy-duty lathe in operation, cutting various types of steel. Different lathe accessories and cutaway demonstration parts are shown, including the Axelson portable pipe-threading machine, electrically operated. This machine threads pipe in sizes from one-half inch to two inches and is one of the latest developments in its line. To demonstrate the fatigue, tensile and impact resistance of various steels used in the company's products, different types of laboratory equipment are shown, the principal mechanism being a sinod impact tester.

## Patterson-Ballagh Company

### BETTIS PISTON, DRILL STABILIZER, AND BETTIS PROTECTOR

Patterson-Ballagh Company is showing the new Bettis piston, the new Bettis drill stabilizer and Bettis protectors. The progressive methods of manufacturing the rubber are shown at different stages of production and test samples of Bettis rubber are to be distributed.

The various sizes of Bettis protectors and drill stabilizers are shown and numerous products that have been in service for an exceptionally long time or have broken drilling records are on exhibit. The new Bettis piston is effectively demonstrated.

## Rieber Instrument Corporation

### RIEBER MACHINE

Rieber Instrument Corporation, occupying part of the Patterson-Ballagh exhibit, is demonstrating the surveying of oil wells by showing the Rieber machine and its method of operation. To further illustrate the surveying of wells a celluloid model of the underlying strata is shown duplicating the actual course of a California well.

## Los Angeles Steel Casting Company

### TEST BARS AND CASTING

Los Angeles Steel Casting Company is showing its test bar and castings, made of the specially formulated Nikeladium alloy steel and subjected to the most rigorous field and machine tests that could be devised.

This newly perfected alloy steel has a well-balanced combination of tensile strength with lightness, it is claimed. Castings made of Nikeladium are said to give more than ordinary resistance to natural fatigue and vibration without entailing the disadvantages of excessive weight and special reinforcement.

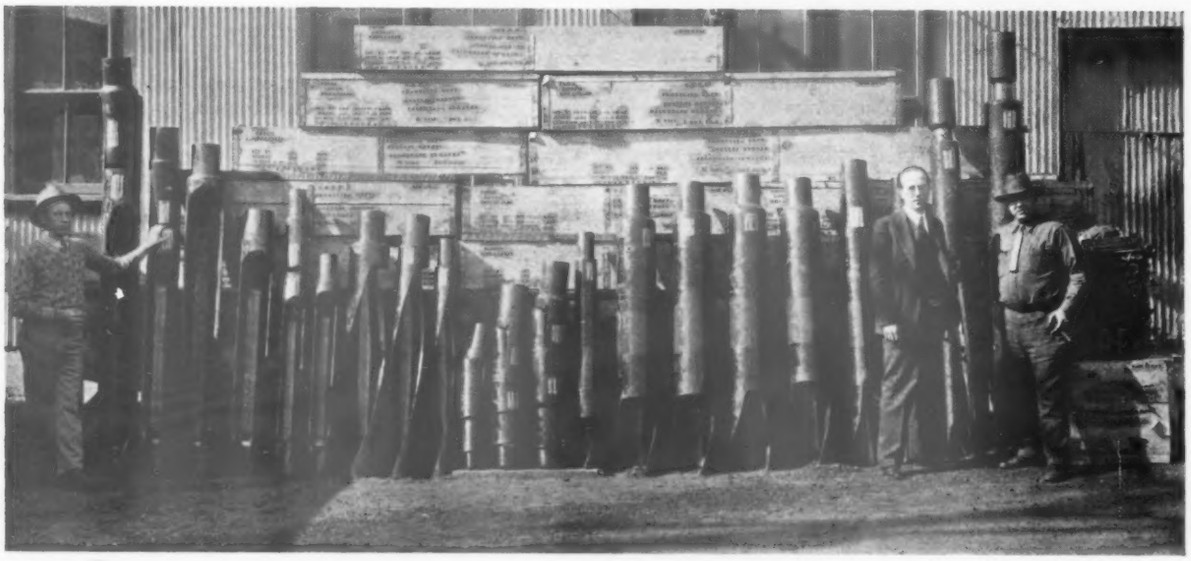
Case histories and charts, revealing unusual records for dependability and economy made by Nikeladium castings in a wide variety of services and under all sorts of conditions are displayed.

# SOTCO

## OIL WELL FISHING

# TOOLS

***are daily proving their efficiency, speed and economy throughout the entire oil world!***



*This photograph is eye-evidence of the widespread demand for "SOTCO" Products. It shows a recent shipment of "SOTCO" Rotary Fishing Tools and Derrick Safety Devices to Sumatra, Dutch East Indies*

*Merit alone is responsible for the world-wide demand for*

**"SOTCO" PRODUCTS**

"SOTCO" Hydraulic Giant Knuckles (dog-leg)
"SOTCO" Hydraulic Wall Hooks
"SOTCO" Plain Wall Hooks
"SOTCO" Adjustable Grabs
"SOTCO" Spiral Fishing Tool Guides
"SOTCO" Combination Trip Packoff Overshots (Socket)
"SOTCO" Differential Oil Well Pumps
"SOTCO" Differential Plunger Assemblies.
"SOTCO" Improved Wire Line Control.
"SOTCO" Wigle Control Heads.
"SOTCO" Wigle Circulating Heads
"SOTCO" Improved Wigle Rod Hangers
"SOTCO" Derrick Safety Device
McClintic-Marshall Master Steel Derricks (for export)
Ironite (for export)
Aquagel (for export)

THIS shipment was made from our factory January 31, 1930. It is one of the most complete outfits ever shipped to foreign territory, and it will be used in connection with an extensive drilling program in the Far East.

This shipment consists of: "SOTCO" Hydraulic Giant Knuckles, "SOTCO" Hydraulic Wall Hooks, "SOTCO" Plain Wall Hooks, "SOTCO" Combination Trip Pack-Off Overshots (Socket), "SOTCO" Adjustable Grabs, and "SOTCO" Derrick Safety Devices.

*Write for illustrated, descriptive folder containing complete information about all "SOTCO" Products.*

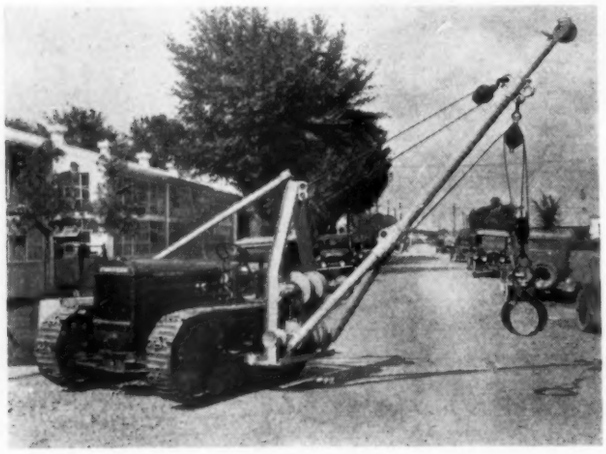
## SPECIALTY OIL TOOL CO.

*Factory:* Brea, California
*Sales Offices:* 507 Merritt Building, Los Angeles, California
Phones: Brea 40 Vandike 2332
*New York Office:* American Steel Export Co., 535 Fifth Avenue
*Cable Address:* "SOTCO", Los Angeles
*Stocked and Distributed by*
Lucey Products Corporation in Mid-Continent and Gulf Coast Territories

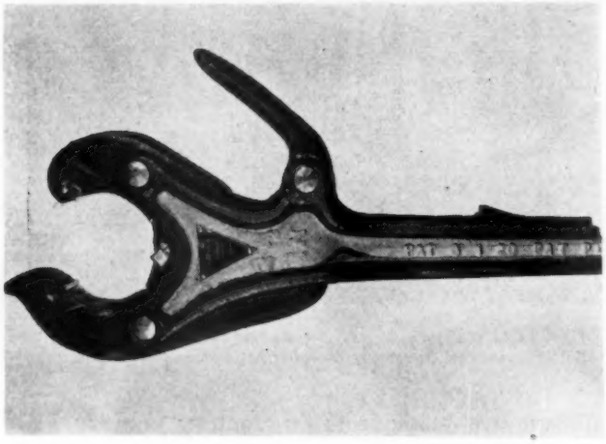
## W-K-M Company, Inc.

### CRAWLER WAGON, SIDE BOOM UNITS, AND TUBING TONGS

W-K-M Company, Inc., Houston, is displaying its W-K-M side boom unit for hillside 30 Model Caterpillar tractor; its W-K-M crawler wagon; its W-K-M side boom unit for 10-20 McCormick-Deering tractor; and its W-K-M tubing tongs.

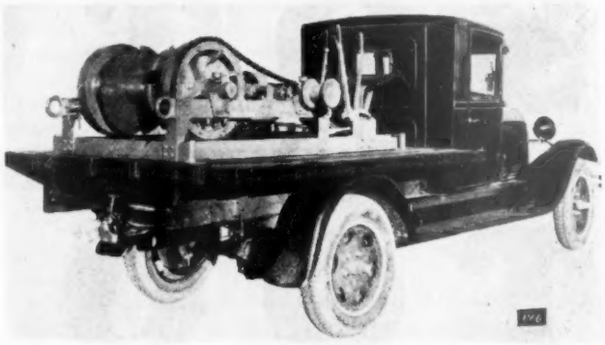


*W-K-M Side Boom Unit for McCormick-Deering Tractor*



*W-K-M Tubing Tongs*

*W-K-M Side Boom Unit for Hillside Special Caterpillar*



*W-K-M Shallow Well Winch*

## Wilkinson Controller Company

### WILCO DUPLEX RELIEF VALVE
### WILCO DUPLEX TANK CONTROL

Wilkinson Controller Company, Los Angeles, is exhibiting its Wilco duplex relief valve and its Wilco duplex tank control.

The Wilco duplex relief valve, because of the extremely large diaphragm area, is actuated by the slightest change in pressure. The links are of graphite impregnated celeron, and are self lubricating. The valve plug will not stick in the guides as its action is always in a straight line. No cocking of the diaphragms can be transmitted to make the valve bind. The regular is equipped with large hand holes, the cover of which may be easily removed for inspection of the valve.

The Wilco duplex tank control may be used wherever vapors are collected from tanks. The controller is a complete system incorporated in a single unit, and is capable of holding the pressure on the tank within 0.3 an inch of water from atmosphere. Adjustment for each valve is independent of the other, the valves working from closed to full open, with almost no variation, without sticking, binding, or chattering. Due to the method of suspending the valve plug, the forces exerted by the pressure on the diaphragms are increased or decreased in accordance with the setting of the links.

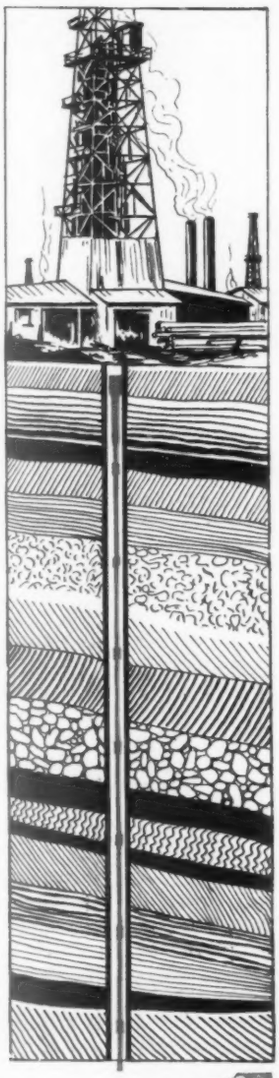
## McCord Radiator & Manufacturing Company

### LUBRICATOR

McCord Radiator & Manufacturing Company, Detroit, is displaying its "LF" lubricator, a mechanical lubricator filling the requirements for a direct visual check on the oil that is being forced to the point of lubrication.

The sight glass for each feed is placed in the discharge line and shows the oil after it has left the lubricator mechanism and is on its way towards the engine part for which it is intended. Clear water, or glycerin, stands in the transparent glass column and is prevented from draining back by the dual steel ball check valve that also serve as discharge valves for forcing and metering pump. A thin wire running through the center of the glass tube guides each drop of oil upward as it leaves the pump and collects in a small pool that floats on the surface of the water and extends upward through the length of the discharge line. It may be operated by means of a ratchet, direct pulley, worm-and-wheel, or spur gears. Each pumping unit with sight glass is removable at an instant notice by merely disconnecting the discharge line and loosening a single holding screw.

# Your bits belong here



## DOWN IN THE HOLE DIGGING AWAY ——

## BLACKOR

## will keep them there

**THE longer you can keep your bits down in the hole...actually cutting...the quicker you will reach oil and the less your hole will cost. That's what Blackor does! When applied to the cutting edges of your bit...it armors the bit against rapid abrasion and prevents frequent pulling of the string to attach sharp bits. Under ordinary conditions a change takes 2 1/2 hours for the round trip at 4000 feet; 3 hours at 5000 feet; 4 hours at 6000 feet and 5 hours at 7000 feet. In general the formation in the deeper zones is harder and dulls bits more quickly than the formations near the surface, therefore even a small increase of hole drilled per bit decreases costs and increases drilling speed.**

**In actual drilling, Blackor-ed bits have given from 3 to 5 times longer life than unfaced bits and 10 times longer life is not uncommon. Put Blackor on your bits and note the difference!**

**Ask for Catalog.**

Blackor is granular in form and is one of the hardest materials known and the most resistant to abrasion. It is applied with the carbon electric arc. Requires no previous experience to apply. Your welder can do it.

PROTECTED BY AMERICAN PATENT PROTECTION CORPORATION

Licensed under Patent Numbers: 1,613,942, 1,424,536, 359,925, 30,021, 16,347, 15,311 2,580, 1,069
*Reissue No. 17,323*
*Other Patents Pending.*

**BLACKOR COMPANY**

*Head Office:* 13,007 South Main Street
Los Angeles, California

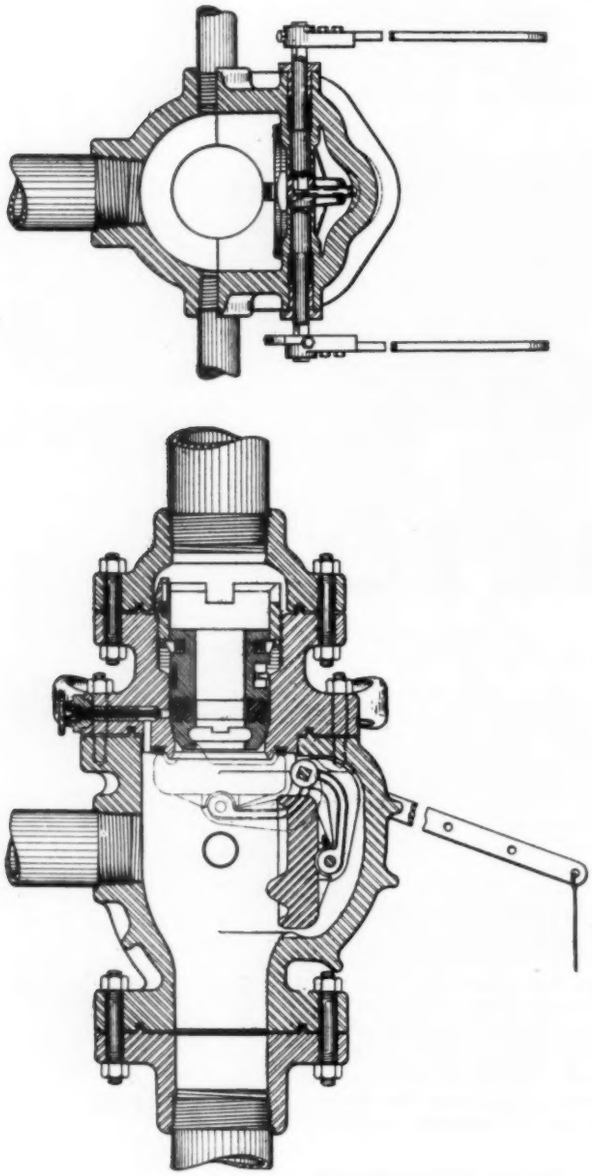
*New York Export Office:* 39 Cortlandt Street
*Tulsa, Oklahoma Office:* 410 Thompson Bldg.
*Houston, Texas Office:* 616 Public National Bank Bldg.

# BLACKOR

**The Super Abrasion-Resistant Facing**

## Baker Oil Tools, Inc.

### DRILLING VALVE AND BLOWOUT PREVENTER



Baker Oil Tools, Inc., Huntington Beach, California, is displaying its new Model "B" combination drilling valve and blowout preventer; Baker rotary shoe; Baker all metal pitman; Baker-Kammerer pitman weighted counterbalance; Baker hydraulic core extractor; and Baker cement floating, guiding and cementing equipment.

The Baker combination drilling valve and blowout preventer combines in one compact balanced unit, a blowout preventer and a drilling valve. It is constructed of cast electric steel, and is designed for a safe working pressure of 25,000 pounds per square inch. It is tested to a hydrostatic pressure of 5000 pounds per square inch. The main body is flanged on the bottom and fitted to a companion flange to conform with the size of the pipe or casing in the well. Copper packing, with a tongue and groove joint, is used on all flanges. The six-inch circulating flow outlet is tapped for six-inch standard, extra heavy pipe (eight thread, ¾-inch taper). The two three-inch openings on opposite sides of the body are tapped for three-inch extra heavy standard pipe (eight thread, ¾-inch taper) to permit the connection of flow lines.

The flapper valve is loosely fitted to a split square shaft, which extends outside the body and to which levers are attached at angles optional with the operator. The flapper valve seats on a copper seat which is placed in the bottom end of the body neck. The heavy projection at the bottom center of the valve is intended to safeguard against tool joints, collars, and other projections coming in contact with the lower edge of the valve.

The split shaft to which the valve is fitted affords two points from which the valve may be operated. The levers furnished can be formed into any shape to fit hookup and rig conditions, to which wire lines or rods can be attached of sufficient length to permit safe operation of the valve at various points about the rig. Positive packing off where the shafts pass through the body is produced by the internal pressure exerted on the ends of the shafts, which are constructed in such a way that shoulders come in contact with a packing gland, compressing the hydraulic packing.

The valve locking device is so constructed as to prevent the locking of the valve until the valve is brought very near the valve seat. This will permit free movement of the valve without any danger of the valve locking unless it is intentionally brought into or near the locking position.

## Oil Country Specialties Manufacturing Company

### GRAY DEEP WELL SWIVEL

Oil Country Specialties Manufacturing Company, Coffeyville, Kansas, and Hynes, California, is displaying the Gray deep well swivel, which this company now manufactures for the California trade as a license of the Gray Tool Company, Houston; in addition, the well known rig fronts and sand reels, manufactured and sold by the former company for some time past, are exhibited. The exhibit is by Hillman-Kelly, Inc., Los Angeles.

The Gray deep well swivel employs the straightpull construction, lifting the load from the bottom, thus eliminating the possibility of distortion or pulling together of swivel casings and avoids the cramping of working parts. The bail is braced crosswise, eliminating the tendency of pulling it together under strain. A bearing of equal proportions to the lower main swivel bearing is placed on top of shoulder of stem, preventing any side play in stem. The lower oil bath packing gland and wash pipe gland can be packed without inserting packing through the threads. The gooseneck is attached with bolts instead of studs. All parts assure that heaviest will pull in two before the machine shows any distortion whatsoever.

## Continental Equipment Company

### CONTINENTAL PUMP

Continental Equipment Company is showing the improved Continental pump, which operates without the use of plungers or sucker rods. The pump is exhibited together with the Continental slush pump piston, which is one of the newest developments in piston design.

The Continental pump utilizes the atomizing principle and is operated by air or gas under pressure. The pressure actuates a simple turbine motor within the pump and the pressure also atomizes the oil, relieving the hydrostatic load so that the oil is lifted from its level by the atomizing method.

# SKILLED SUPERVISION GUARANTEES THE QUALITY OF GULF PRODUCTS

## COASTAL AND PARAFFINE CRUDES
## GASOLINE — LUBRICATING OILS
## NAPHTHA — GAS — OILS
## WAX — PETROLEUM COKE
## CYLINDER—ENGINE—CORDAGE

## GULF REFINING COMPANY

*General Sales Offices*

PITTSBURGH, PA.

*District Sales Office*

New York Boston Philadelphia Louisville Atlanta Houston New Orleans

*Ocean Terminals*

Boston (Beverly), Mass.
Providence, R. I.
New York Harbor (Bayonne, N. J.)
Jacksonville, Fla.
Port Tampa, Fla.
Mobile (Magazine Point, Ala.)
Philadelphia (Girard Point, Pa.)
Charleston, S. C.
Savannah, Ga.
New Orleans (Gretna, La.)
Port Arthur, Texas
Galveston, Texas

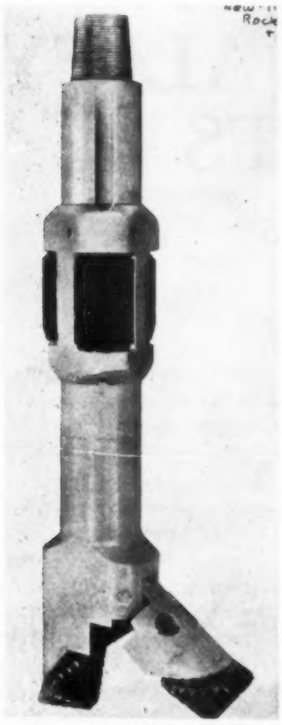
## Wieman-Kammerer-Wright Company, Inc.

### CATHEAD PULLER

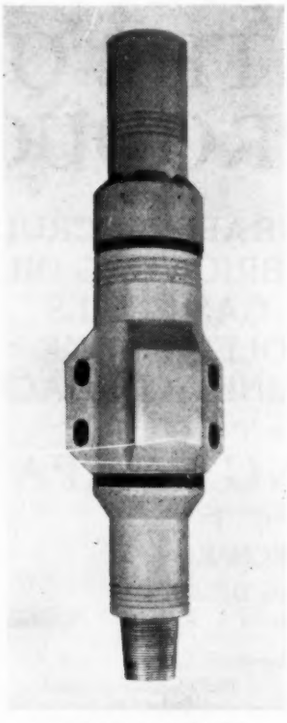
*W-K-W Cathead Puller*

Wieman-Kammerer-Wright Company, Inc., Hollydale, California, are showing the Wentworth-Long cathead puller, patent rights having been acquired recently; the Wieman-Kammerer-Wright pipe guide; hinged rock bit; the roller bit, and the tubing swab.

The Wentworth-Long cathead puller utilizes the power of the drilling engine to remove catheads, eliminating burning them off. It has a pulling capacity in excess of 100,000 pounds.



*W-K-W Hinge Type Rock Bit Shank and Reamer*



*W-K-W Pipe Guide*

### ROLLER BIT

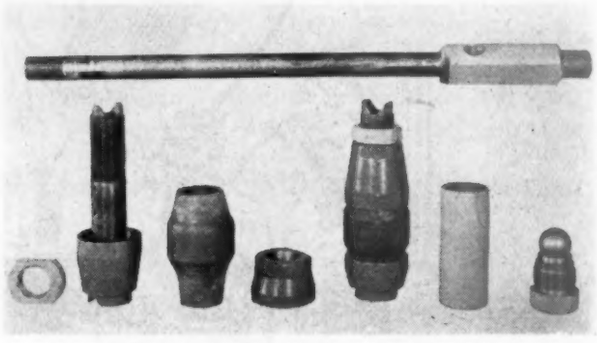
The Wieman-Kammerer-Wright bit utilizes an entirely new principle of cutting and is especially adapted for semi-hard and tough formations and also cuts soft formations. The cutters are locked to the bearing pins with the patented Varco locking ring and can not be lost off. The roller reamers, which are a part of the cutters, insure full gauge hole at all times.

### HINGED ROCK BIT

The new hinged type rock bit shank is for use with the Weiman-Kammerer-Wright Varco cones and a three-point reamer. This shank makes the changing of cones a very simple operation and the three-point reamer assures round full gauge hole as well as a steady running bit.

### PIPE GUIDE

Improvements have recently been made on the Wieman-Kammerer-Wright pipe guides, which are made of mild steel with a three-way bearing against the wall of the hole. The rubber covered sub rotates freely within the guide.



*W-K-W Tubing Swab*

Wear due to end thrust is eliminated by the use of rubber washers. There is no lateral "give" or spring to the guide and it has successfully maintained straight holes. Because of the three-way feature, circulation clearance is ample.

### TUBING SWAB

The tubing swab is a quick change swab on which the rubber assemblies can be changed in a few seconds without breaking the swab from the stem. New rubbers can then be assembled by the tool dresser ready for the next replacement while the driller is running back in the hole.

## Jos. A. Masterson & Company

### BALL AND ROLLER BEARINGS

Jos. A. Masterson & Company, Los Angeles, is showing its line of precision ball, roller, and roller thrust bearings of sizes and types more generally used in oil field equipment, such as sheaves, swivels, rotary tables and drives, draw works, reduction gears, pumping jacks, hooks, rod hangers, hoists, suction pumps and booster and centrifugal pumps.

## Sterling Electric Motors, Inc.

### STERLING KLOSD-TITE ELECTRIC MOTORS

Sterling Electric Motors, Inc., Los Angeles, is displaying its line of Klosd-tite electric motors, which are insulated by a mica-bestos process, a feature of these motors.

The Sterling Klosd-tite motor has winding, air gap, rotor, and bearings completely enclosed by a substantial cast iron inner case, which is easily disassembled. Inner enclosing cases have air directing veins and large radiating spaces, and large passages between inner and outer cases for cooling air.

Typical Lufkin Baby Unit installation, Shell Oil Company of California, Freeman Lease, Round Mountain, California, wells on this lease 1600 to 2000 feet 3" tubing.

THE LUFKIN LINE

BABY IN SIZE

GIANT IN PERFORMANCE

# The LUFKIN BABY UNIT

The Lufkin Baby Unit is doing a "man-size" job in California. Designed for shallow wells where powers are not practical, this unit is operating efficiently on wells 2000 feet and deeper tubed with 3" tubing and producing 250 to 400 barrels fluid daily with practically no gas pressure.

One of the major operators in California has standardized on Lufkin Units, as a result of the performance of their first few. Seventeen Units now in operation by this company.

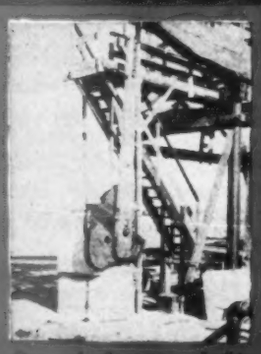
A letter addressed to Lufkin or one of our branch offices will bring full information.

*California District Office:*
601 Commercial Exchange Bldg., Los Angeles, California
E. P. TROUT, *Dist. Mgr.*

*Branch Offices and Warehouses:* Houston, Texas; Tulsa, Okla; New York, New York; Odessa, Texas; Seminole, Okla; El Dorado, Ark.

*Factory and General Office:* LUFKIN, TEXAS

LUFKIN FOUNDRY & MACHINE COMPANY



One of Seventeen Lufkin Baby Units in a row—Richfield Oil Co., West Front, Bakersfield, Calif., well depths 2000 to 2350 feet equipped with 3" tubing averaging 250 to 400 barrels fluid daily.

## Wieman-Kammerer-Wright Company, Inc.

### CATHEAD PULLER

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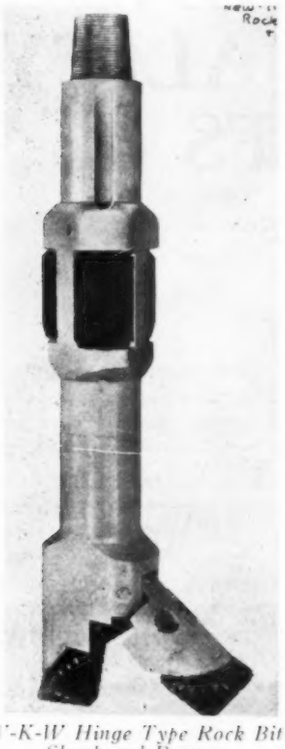
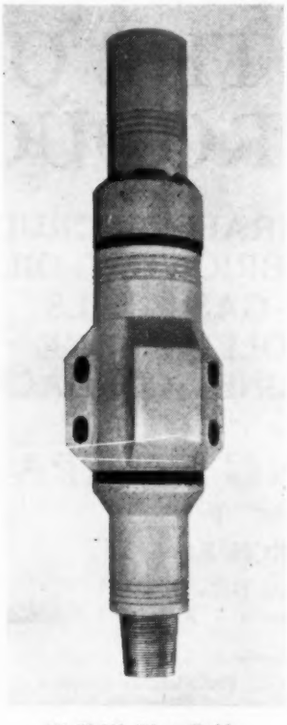


*W-K-W Hinge Type Rock Bit Shank and Reamer*



*W-K-W Pipe Guide*

### ROLLER BIT

The Wieman-Kammerer-Wright bit utilizes an entirely new principle of cutting and is especially adapted for semi-hard and tough formations and also cuts soft formations. The cutters are locked to the bearing pins with the patented Varco locking ring and can not be lost off. The roller reamers, which are a part of the cutters, insure full gauge hole at all times.

### HINGED ROCK BIT

The new hinged type rock bit shank is for use with the Weiman-Kammerer-Wright Varco cones and a three-point reamer. This shank makes the changing of cones a very simple operation and the three-point reamer assures round full gauge hole as well as a steady running bit.

### PIPE GUIDE

Improvements have recently been made on the Wieman-Kammerer-Wright pipe guides, which are made of mild steel with a three-way bearing against the wall of the hole. The rubber covered sub rotates freely within the guide.

*W-K-W Tubing Swab*

Wear due to end thrust is eliminated by the use of rubber washers. There is no lateral "give" or spring to the guide and it has successfully maintained straight holes. Because of the three-way feature, circulation clearance is ample.

### TUBING SWAB

The tubing swab is a quick change swab on which the rubber assemblies can be changed in a few seconds without breaking the swab from the stem. New rubbers can then be assembled by the tool dresser ready for the next replacement while the driller is running back in the hole.

## Jos. A. Masterson & Company

### BALL AND ROLLER BEARINGS

Jos. A. Masterson & Company, Los Angeles, is showing its line of precision ball, roller, and roller thrust bearings of sizes and types more generally used in oil field equipment, such as sheaves, swivels, rotary tables and drives, draw works, reduction gears, pumping jacks, hooks, rod hangers, hoists, suction pumps and booster and centrifugal pumps.

## Sterling Electric Motors, Inc.

### STERLING KLOSD-TITE ELECTRIC MOTORS

Sterling Electric Motors, Inc., Los Angeles, is displaying its line of Klosd-tite electric motors, which are insulated by a mica-bestos process, a feature of these motors.

The Sterling Klosd-tite motor has winding, air gap, rotor, and bearings completely enclosed by a substantial cast iron inner case, which is easily disassembled. Inner enclosing cases have air directing veins and large radiating spaces, and large passages between inner and outer cases for cooling air.

Typical Lufkin Baby Unit installation, Shell Oil Company of California, Freeman Lease, Round Mountain, California, wells on this lease 1600 to 2000 feet 3" tubing.

THE LUFKIN LINE

# BABY IN SIZE

# GIANT IN PERFORMANCE

# The LUFKIN BABY UNIT

The Lufkin Baby Unit is doing a "man-size" job in California. Designed for shallow wells where powers are not practical, this unit is operating efficiently on wells 2000 feet and deeper tubed with 3" tubing and producing 250 to 400 barrels fluid daily with practically no gas pressure.

One of the major operators in California has standardized on Lufkin Units, as a result of the performance of their first few. Seventeen Units now in operation by this company.

A letter addressed to Lufkin or one of our branch offices will bring full information.

*California District Office:*
801 Commercial Exchange Bldg., Los Angeles, California
E. P. TROUT, *Dist. Mgr.*

*Branch Offices and Warehouses:* Houston, Texas; Tulsa, Okla; New York, New York; Odessa, Texas; Seminole, Okla; El Dorado, Ark.

*Factory and General Office:* LUFKIN, TEXAS

LUFKIN FOUNDRY & MACHINE COMPANY

One of Seventeen Lufkin Baby Units in a row—Richfield Oil Co., West Fronc, Bakersfield, Calif., well depths 2000 to 2350 feet equipped with 3" tubing averaging 250 to 400 barrels fluid daily.

## Chicago Pneumatic Tool Company

### CP TUCONE ROCK BIT

Chicago Pneumatic Tool Company, New York, is displaying its CP Tucone rock bit, but recently put on the market.

This bit is a one-piece manganese steel casting, with cutting cones separated to a scientifically determined degree, and their position in the bit body so arranged that the fluid stream is impinged directly on the bottom of the hole, thereby more effectively carrying away the cuttings. This does away with sidewall hydraulicking, and avoids pressure upon the sides of the hole which cause side-hole washouts and lead the bit from its true vertical course. The two cutting cones are so placed in the body that they alone stand the brunt of the drilling action.

The reamer body is a one-piece manganese steel casting, assuring strength, rigidity, and durability. The CP cone assembly consists of a cutting cone with deep-set teeth designed from practical experience to meet various conditions mounted on an extra large bearing; and the entire assembly is held securely in the bit body by a washer, nut, lock nut and cotter pin which are easily removable.

## Spherical Oil Well Surveying Co., Ltd.

### SPHERICAL OIL WELL SURVEYOR

Spherical Oil Well Surveying Company, Ltd., Long Beach, California, is displaying its spherical oil well surveyor, a new device for determining in the hole the true declination from perpendicular.

Its operation is based on the force of gravity and time. Two hemispheres, upon which the declination readings are made, are hung by four-way suspensions which allow them to swing free and plumb at all times regardless of the angle at which the machine may be inclined. Ballasting of the upper one and counter weighting of the lower keeps them in a perpendicular position. Engraved upon the surfaces of the hemispheres are parallels of latitude at two degrees intervals, and meridians of longitude at six degrees intervals; and it is by means of these markings that the degree of disinclination is recorded, at the finish of the survey.

## Regan Forge & Engineering Company

### NEW CROWN BLOCK

Regan Forge & Engineering Company is exhibiting for the first time three developments, including a nine-sheave crown block which is said to be the largest and heaviest duty block ever constructed, having a rated capacity in excess of 800,000 pounds. This block has a single deck and is equipped with 48-inch sheaves. It has an extremely low center of gravity, offers great rigidity and is equipped with two oscillating sheaves that permit true alignment to the traveling block regardless of the size sheave used in the latter. The block is composed of sub-assemblies, permitting much easier assembly. Small units can be elevated to the top of the derrick. This will be known as Type C crown block.

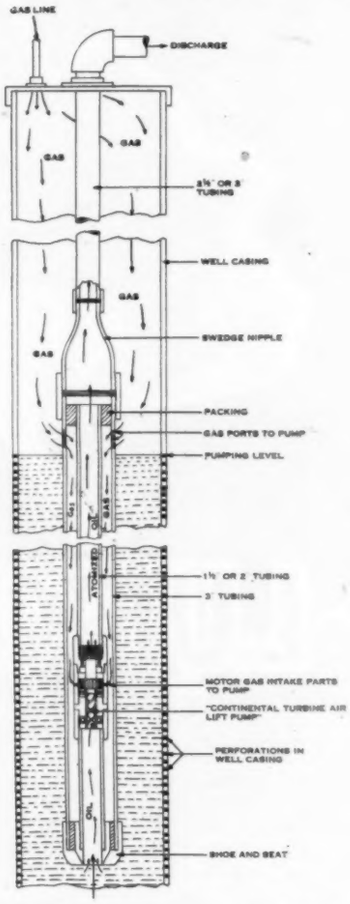
The company also is showing a six-sheave traveling block known as Type 3B, and it is constructed of the heaviest materials, offers extreme rigidity and embodies 39½-inch sheaves set staggered fashion with dual bearings for each sheave and integral pin rotating with its individual sheave. The combination of this six-sheave traveling block with the extra high capacity, true alignment Type C crown block is said to be the largest equipment of its kind ever constructed.

A premiere showing is also given of the new high pressure control equipment to meet pressure tests up to 6000 pounds. The organization has classified its control equipment into three divisions, namely Type A for normal pressures, Type B for medium pressures tested to 3000 pounds and Type C for high pressures tested to 6000 pounds. In the higher pressure classifications the flanges, spools, couplings, tubing heads, etc., are much heavier in weight and each type is designed in accordance with good engineering standards. A complete assembly of high pressure Christmas-tree fittings, high pressure valves, high pressure tubing head and the control head proper will be exhibited as a unit.

Other equipment shown includes the Regan swivel, Regan blowout preventers, Regan gas controller and miscellaneous equipment.

## Continental Equipment Company

### CONTINENTAL AIR LIFT TURBINE PUMP




Continental Equipment Company is displaying a complete working model of the new Continental air lift turbine pump.

The tubing is in the form of glass tubes so that the observer can watch the atomization of the fluid as it is being lifted from the well. A Gardner-Denver air compressor will be utilized to actuate the pumping mechanism.

In addition to the display of Continental pumps the manufacturer is also showing new Continental piston for slush pumps.

**THE FIRST OF A SERIES**
of advertisements by the Oklahoma Contracting Company showing the history and the development of the pipe line industry.

# A NATIVE RUNNER MADE THE FIRST PIPE LINE OUT OF A BAMBOO ROD

In Upper Burma, east of the Bay of Bengal, the bare feet of native carriers for numberless centuries have trod the paths between the shallow oil wells and the river. Oil is drawn from the ground by a pulley and goatskin bucket, where it is transferred to earthenware jars, and carried on the shoulders of the runners to the river. There, it is poured into the hold of the boat.

. . . Once there was a runner who grew weary of his load, who wondered if the crude oil might not be made to flow of its own gravity down to the river. From a hollow bamboo rod he made the first pipe line ever used for the transportation of petroleum. In theory it worked. In practice, it leaked at the joints. He gave up his dream, became a runner again, and his invention was buried under the dust of centuries . . .

Although oil was produced in Asia hundreds of years before the Christian era, methods of petroleum transportation were very primitive and makeshift until 1865 when an American laid the first successful pipe line. Fields all over the world are today connected with seaport, railroad, refinery, and civilization by oil and gas pipe lines.

LUBBUB SWAMP

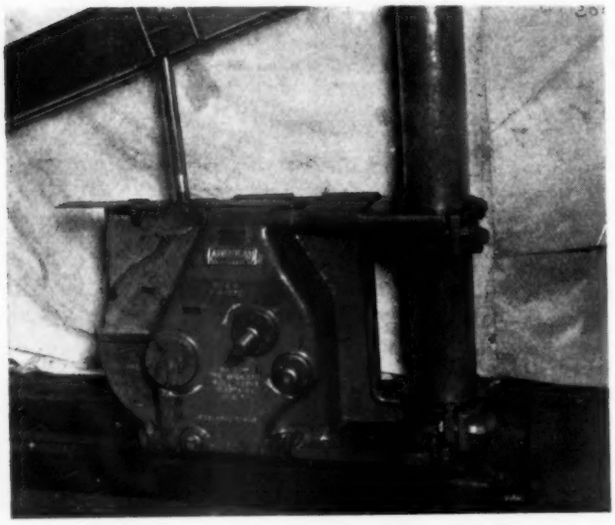
*On the Monroe-Atlanta Line—*

The Oklahoma Contracting Company laid the pipe from Yazoo City, Miss., to Tuscaloosa, Ala., —approximately 200 miles—for the Southern Natural Gas Corporation's 22″ line from the gas fields of Monroe, La., to Atlanta.

The laying of this line through swamps, thickly wooded sections, and over mountains was one of the most difficult jobs in pipe line history. The work was carried on in the dead of winter, yet *all requirements for completion dates were fulfilled on the contract specified time.*

OKLAHOMA CONTRACTING COMPANY DALLAS TULSA

## American Well Works, Inc.



### OIL WELL PUMPING JACK

American Well Works, Inc., Aurora, Illinois, is displaying its new 4-A oil well pumping jack, with new gear case slot inclosure.

The new American oil well pumping jack embodies an innovation in the new gear case slot enclosure, which avoids the danger of sand and grit entering the oil bath and causing unusual and unnecessary wear. Double gears are furnished on all units and all gears are totally enclosed and run in oil. Likewise all bearings in the gear case, including the lower pitman bearings, are automatically oiled and require no attention. All walking beams are built up to two channels with pitman saddle so arranged as to permit the pitman rod to pass between the channels. Mud-heads are so constructed and assembled that no strain comes on the bolts. Cable sling and slips for gripping polish rod are part of standard equipment.

## Spartan Steel Company

### HARD FACING MATERIALS, BITS AND DETACHABLE FISHTAILS

Spartan Steel Company, Compton, California, is showing new improvements in abrasion-resisting materials and oil drilling tools.

A new metal called "Tungspar" is offered as the latest development in hardfacing for oil drilling bits and other surfaces subject to severe wear. Contemporary with the development of this metal, Spartan Steel Company created Duridium diamonds, a metallic substance exceeded in hardness only by the genuine diamond. In addition to these developments there are displayed new designs in rotary drilling tools—the Spartan keenshear bit and the detachable fishtail.

The Spartan keenshear bit is so designed that the cutters may be detached and thrown away when worn down, enabling the driller to put new steel in the hole every time, instead of redressing the old bits. Because of the extreme resistance of the cutters to abrasion through the use of Tungspar hardfacing and Duridium diamonds, one round trip in the hole is saved out of every four or five runs, it is claimed.

The new Spartan keenshear bit reverses the action and throws the cuttings outwardly into the path of circulation, thus minimizing possibility of the bit "balling up." The inner cutters shear the formation outwardly. The outer teeth pilot the digging and permit drilling a straighter hole. Outer cutting edges are parallel, doing the work of a reamer and insuring full gauge. The same shank is used over and over again as worn bits are replaced by new bits, thus effecting a great saving. Pyrometer controlled heat treatment is given each bit at the factory, insuring uniformity.

The detachable fishtail embodies detachable cutters and modernizes this time-honored type of bit.

Other improved products shown are a three-way and a four-way bit and a boltless belt clamp.

## Robinson Orifice Fitting Company

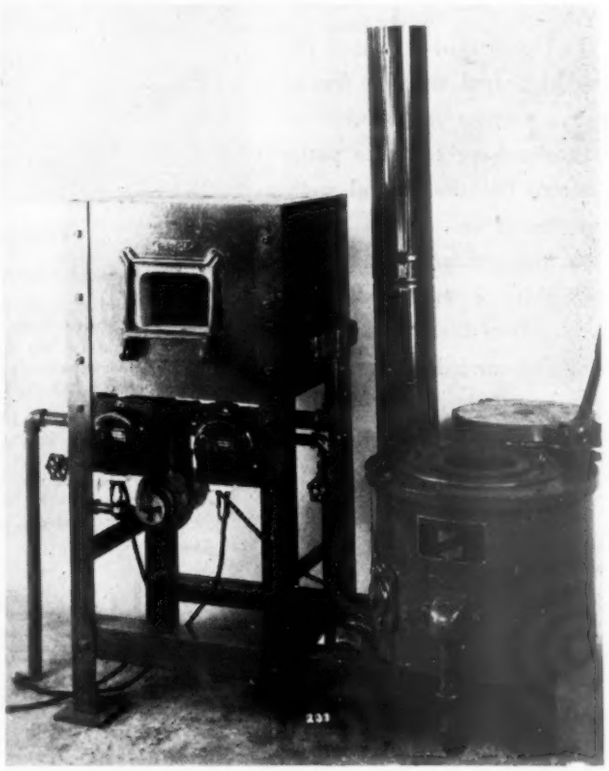
### ORIFICE FITTINGS

Robinson Orifice Fitting Company is displaying modern and efficient types of orifice fittings, with new and exclusive principles, resulting in savings in installation and frequent changing of orifice plates, it is claimed, as well as reducing meter accuracy to an exact science. The ease with which one man can make an entire installation without assistance is shown.

## James H. Knapp Company

### INDUSTRIAL FURNACES

James H. Knapp Company, Los Angeles, is displaying its combination furnace, which is suitable for a wide range of work, especially tool dressing, tool hardening, salt drawing and tempering. The furnace is 22 inches wide by 36 inches deep, and is equipped with full automatic temperature control of new, standard, reduced in-put type.



# These 3 features are found only on

## W-K-W SAFETY CONES

(FORMERLY "VARCO")

### 1 The Safety Bushing

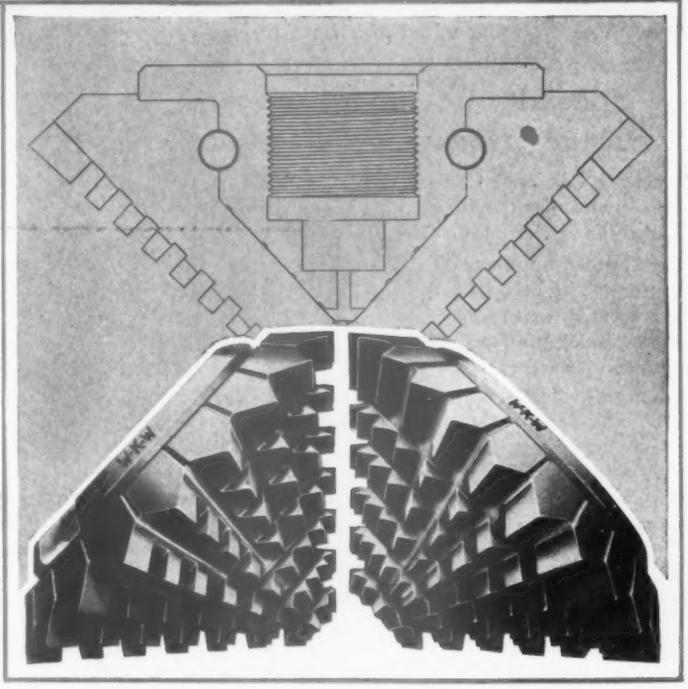
Of the thousands of sets used not one W.K.W. Cone has been left in the hole. The bushing is held to the cone by a piece of alloy steel rod which forms an unbreakable, yet flexible connection.

### 2 The Ease of Assembly

The exclusive method by which W.K.W. Cones are assembled and removed from the bit entirely eliminates cutting them off, as is so common with other types.

### 3 The Mounting of Cones

The design of W.K.W. Cones is such that the teeth do not wear out by riding each other. All wear on the teeth comes from contacting formation, and maximum footage is obtained from every cone.



**W.K.W. Cones are slush lubricated.** The advantages of slush lubrication in the W.K.W. Cones are many, the most important advantage being the elimination of a mechanical lubricator. Time is saved in assembly as it is not necessary to have extra joints of drill pipe with extra connections to take care of a lubricator.

**W.K.W. Cones are hard faced.** The outside bevels on the cones are stellited, thereby keeping them to gauge much longer than would be possible by merely heat treating.

W-K-W SAFETY CONES

"GO STRAIGHT THROUGH THE EARTH"

## WIEMAN-KAMMERER-WRIGHT CO., INC.

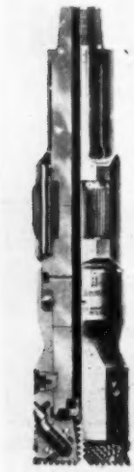
Hollydale [Los Angeles Co] California

## Byron-Jackson Company

### BYRON-JACKSON ROCK BIT

Byron-Jackson Company, Los Angeles, is displaying its rock bit.

The reamer shank which houses a three-point reamer, is connected to the drill collar in the ordinary way. The lower portion of this shank contains a housing into which is set the driving gear member. The cones are of the usual type with the exception that on the back face of them a gear is forged. The teeth on the driving gear mesh with the teeth on the back of the cones so that the rotation of the shank causes the cones to revolve on their shafts. Thus the weight of the drill stem is transferred directly from the shank to the cones. The body is held on the shank by four large body retaining pins, which are not called to work except when bit is being withdrawn from the well.



## Specialty Oil Tool Company

### "SOTCO" HYDRAULIC LINE SPOOLER

Specialty Oil Tool Company, Los Angeles, is displaying its new hydraulic line spooler, with improvements designed to make the device more effective, and easier to install.

The "Sotco" improved line control is operated by hydraulic action. The body is built of two-inch pipe which serves as a reservoir for the oil. Two plungers, each having a 34-inch movement, and actuated by the oil being forced backward and forward through the pipe, causes a "drag" on the cable, resulting in a smooth uniform coil of the line on the drum. The flow of the oil is controlled by a valve placed in a convenient position so that when pulling a heavy string of pipe the fluid can be increased or decreased as required. Corners of the body frame are welded solid and arranged to give ample clearance to the cat line.

## Hercules Motors Corporation

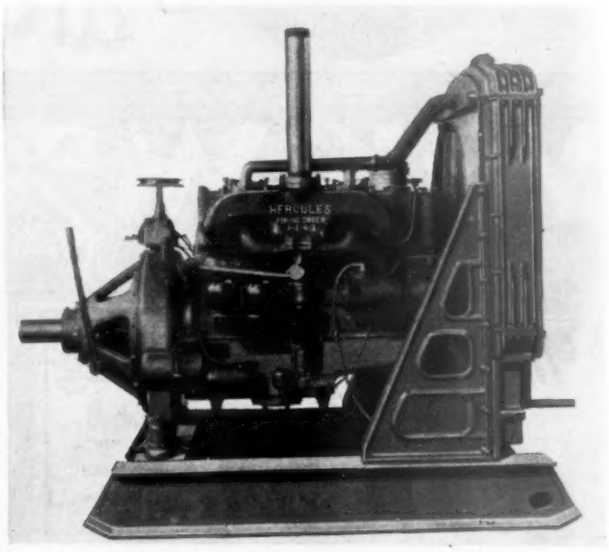
### ENGINES

Hercules Motors Corporation is displaying a full line of power units and engines covering a wide horsepower range, which are designed for complete adaptability to the various oil field uses.

Hercules engines and power units equipped for operation either on gasoline, kerosene, natural gas or distillate, are operating on compressors, cable tool-drilling units, oil, mud and water pumps and gas-electric power plants, with special attention to the demands of sustained heavy-duty operation. The bearing areas are unusually large and the bearing pressure correspondingly low. Positive lubrication is had by a forced feed oiling system to all bearing points from a gear driven oil pump located below the oil level. The extra capacity cooling system with water jacketing the entire length of the cylinder barrels, and designed in such a manner as to direct a stream of water around each exhaust valve, and water pump capable of an unusually high lift, insure proper engine cooling under the most extreme operating conditions.

The feature of the display is the TXO oil field power unit, which includes the TXO four-cylinder engine, especially equipped for oil field purposes. It is a fully enclosed unit with clutch power takeoff and reduction gears, all mounted on a rigid frame built of I beams, which facilitate temporary mounting in the fields.

Other Hercules displays are the OOA model power unit of the OO series; the OX series engine arranged for replacement in the Fordson tractor; the WXC model and YXC model engines of the WX series and YX series of six-cylinder motors mounted on pedestals.



## Shaffer Tool Works

### SHAFFER CELLAR CONTROL GATE

Shaffer Tool Works is showing the Shaffer cellar control gate, a recent addition to the Shaffer line of high-pressure equipment. With this device, it is possible, according to the manufacturers, to obtain a shut-off when there is pipe in the hole, in the same manner that a drilling valve closes open hole. As a safety device, the gate is attracting considerable attention, especially in wildcat fields and in known high-pressure territory.

The Shaffer Tool Works in addition is showing a complete line of high-pressure cellar and Christmas tree fittings, including control gates, blowout preventers, casing and tubing heads, adjustable flow beans, etc.

Working models of the T. and T. releasing fishing tools will be featured as well as the high-pressure hydrualic test rack, showing actual tests of control gates, etc., the apparatus being capable of applying a cold-water pressure of 10,000 pounds per square inch.

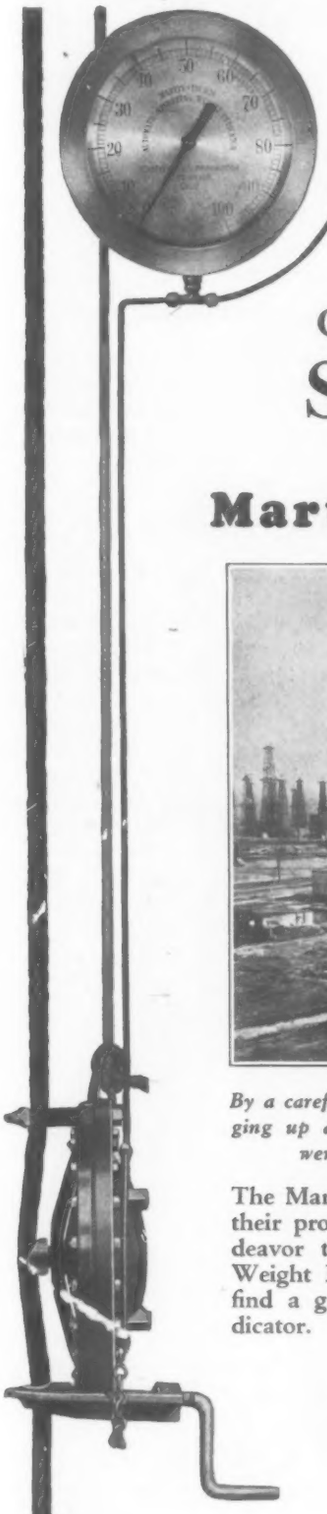
## California Talc Company

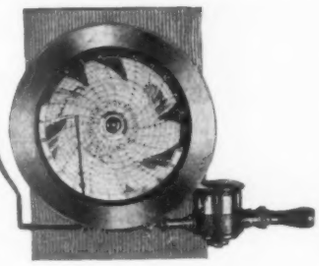
### AQUAGEL

California Talc Company, Los Angeles, is showing, with the aid of a miniature derrick, complete with mud ditch and necessary equipment Aquagel circulating in the ditch. Various cut out boards state the various uses of Aquagel.

Various specimens of rotary muds have been procured from different oil fields throughout the country and these are being demonstrated with, and without Aquagel. Two small mixers used in the actual mixing of Aquagel are shown.

## MARTIN-DECKER AUTOMATIC RECORDING WEIGHT INDICATOR





# 88.8%

**Off All Wells Drilling and Rigging Up in the**

# SIGNAL HILL FIELD

**Are Equipped With**

## Martin-Decker Weight Indicators

*By a careful check made February 7, 1930 there were 98 wells drilling and rigging up and standing cemented with the crews on the job. Of these there were 86 wells equipped with Martin-Decker Weight Indicators.*

The Martin-Decker Corporation has ever aimed at a higher plane for their products. Surely there could be no greater reward for this endeavor than the universal acceptance accorded the Martin-Decker Weight Indicator. Wherever rotary drilling is being done, you will find a great majority of operators using the dependable weight indicator.

Los Angeles
March 16-23
1930

## MARTIN-DECKER CORPORATION

*Formerly*

Martin-Loomis Corporation

*Mid-Continent Distributors*
Reed Roller Bit Company
Houston, Texas

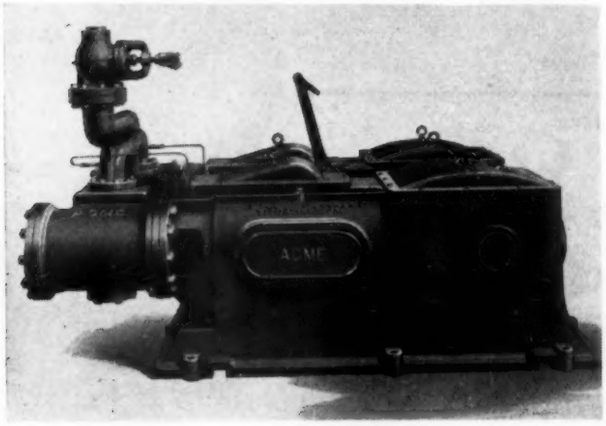
3433 Cherry Ave.,
LONG BEACH
CALIFORNIA

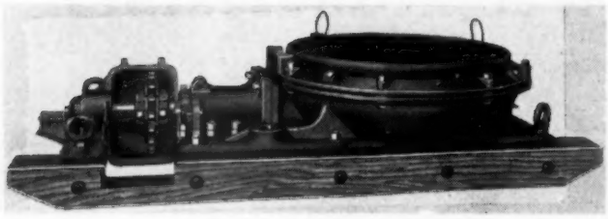
*Foreign Distributors*
Oil Well Supply Company
Pittsburgh, Pa.

WEIGHT RECORDING, MEASUREMENT AND CONTROL

## Titusville Iron Works Company

### TWIN CYLINDER ENGINE AND FLAT ROTARY





Titusville Iron Works Company, Titusville, Pennsylvania, in conjunction with California machinery and Supply Company, Los Angeles, is showing the Titusville totally enclosed 12 by 12 twin cylinder roller bearing steam drilling engine, and the Titusville Acme No. 8 all steel roller bearing flat top rotary.

The No. 8 rotary is of all steel construction except the removable bearing bushing in the base, which is of semi-steel construction to prevent excess in frictional wear. All moving parts, except the pinion shaft and sprocket, are completely enclosed and run in a bath of oil. The pinion shaft, which is driven by chain sprocket, runs on Timken roller bearings, completely enclosed. The gear table has a forged steel bevel gear shrunk and dowel pinned to gear table, and the teeth are machine cut. The gear table sets on roller bearings designed to carry heavy loads. Lubrication of the main working parts is of the oil bath type.

The Titusville twin cylinder steam engine has all working parts fully enclosed, to insure constant, positive lubrication. All moving parts including the valve mechanism operate in an oil bath. The piston rod is provided with a separate independent stuffing box containing metallic oil wiper packing located at the end of the crankcase. It is provided with an extra large crankshaft of forged steel, mounted on heavy duty Timken roller bearings. It has balanced slide valves, and has all moving parts counterbalanced.

## MacClatchie Manufacturing Company

### "PANTHER" AVIATION RADIAL ENGINE

MacClatchie Manufacturing Company, Compton, California, is showing a comprehensive exhibit of oilfield equipment and aviation engines, including the new casing head, the geared brake for draw-works, the well known mud pump valve, cementing combination, including quick change head, lubricated stop cocks and quick unions, MacClatchie pullers for valve seats and pump liners, the improved automatic safety cathead, the positive expansion rotary underreamer, and the flow nipple.

The engine on exhibit is the MacClatchie "Panther" L-head radial. This power plan is particularly interesting to oil men due to its simple lubricating system, made possible through the elimination of rocker arms, long push rods and equally troublesome allied parts. It is a seven-cylinder, air-cooled unit, developing 150 horsepower at 1900 revolutions per minute.

## Turco Products, Inc.

### TURCO CLEANSER

Turco Products, Inc., is showing its Turco cleanser, prepared for cleaning all types of metal surfaces in the petroleum industry, particularly tools and equipment that have been salvaged. Various equipment covered with crude oil and types of dirt is cleaned by this preparation.

## Grant Tool Company

Grant Tool Company, Los Angeles, is showing its new Grant liner puller, new to the market.

An exclusive mechanical expansion principle is among the features which result in unusual speed, efficiency and labor-saving in the operation of pulling liners. By means of a screw, the apparatus can be adjusted to fit any size of liner in two or three seconds, eliminating the laborious old method of changing equipment for each different size of liner. Cast-steel shoes, which expand or contract inside the liner, take an unfailing hold on the liner yet they do not injure or burr the liner as do the majority of the old type pullers. This results in another notable economy as liners can be pulled without injury to the liner. It is made of steel castings and machined forgings. Inasmuch as the entire piece of equipment is not very heavy, one man can easily handle it on any job.

## Liquidometer Corporation

### SCALE GAUGE

Liquidometer Corporation of Long Island City, N. Y., is showing a complete line of automatic precision tank gauges used in refineries, tank farms and service stations. This instrument shows accurately the inventory of the liquid stored in the tank at all times and enables the operator to check all deliveries to the tank and withdrawals from the tank. There are working models of gauges for stationary tanks, marine tanks, and gauges for airplanes, on display.

A feature is the new scale gauge for large tanks which shows not only the amount of liquid stored in the tank, but determines the specific gravity of the liquid as well.

## Automatic Lag Clutches, Inc.

### AUTOMATIC LAG CLUTCHES

Automatic Lag Clutches, Inc., Los Angeles, is displaying the geared motor for slow pumping wells to be used in the place of the present intermittent pumping.

The geared motor features the automatic lag clutch which is built into the motor itself. When the motor is motionless the clutch is in a disengaged position and remains so when the motor is started. This allows the motor to attain its full speed momentum free of load, thus eliminating the high peak current demand.

# H. C. SMITH

## Quality TOOLS

## *Lead the Field in Efficiency, Safety, Speed and Economy*

There is no uncertainty about results when H. C. Smith Quality Tools are used in your drilling and coring operations. You know in advance that these tools will stand up under the severest kind of service, even in the very deepest wells. They meet every condition—*perfectly!*

Upon request, we will gladly send you complete information and performance records of H. C. Smith Quality Tools.

**H. C. SMITH MANUFACTURING CO., INC.**

Los Nietos, California

*Branch Offices and Warehouses:*

Bakersfield, Calif. Ventura, Calif.
Kettleman Hills, Calif. Taft, Calif.
Oklahoma, City, Okla.

*Cable Address:* "Smithco, Whittier"

*The Famous H. C. Smith Type "C" Coring Outfit*

Takes perfect cores in any formation that a fishtail or disc bit will penetrate. Cutter heads can be changed quickly and easily. Serrated feature of bit blades provides easier penetration of all hard and soft formations.

*H. C. Smith Type "G" Drilling Bit.*

Embodies the newest features in drilling tools and is a fast digger in any formation. Eliminates reaming down to get new bit on bottom. Twelve side reamer bit bodies take care of all sizes between 5½" and 27". Write for Catalog No. 31.

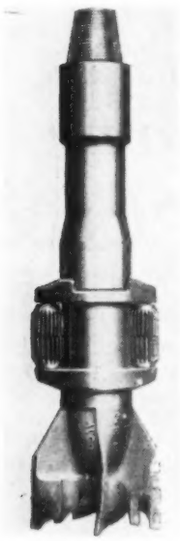
*The New Type "F" H. C. Smith Rock Core Bit.* Operates on a new and different principle and efficiently cores the hardest formations. Has larger cutters, insuring better roller action and larger cutting surface. Side reamers insure full gauge hole and steady bit in the hole. Interchangeable with all other H. C. Smith cutter heads.

## Alco Oil Tool Company

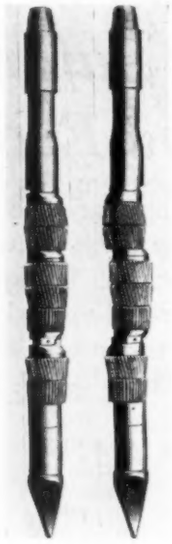
Alco Oil Tool Company, Los Angeles, is displaying its Alco type "C" rotary drilling bit; its Alco underreamer; and its Alco automatic weightcontrol.

The Alco weight control is designed primarily to enable feeding out the drill pipe foot by foot, the while maintaining correct and uniform weight on the bit at all times. The tool has only two moving parts, the mandrel, and the body. The body is machined inside to allow entrance of the square mandrel. The Alco control is placed in the lower end of the drilling string and so spaced above the bit that the weight of the drill pipe below the control plus the weight of the control mandrel, is the exact amount of weight desired on the bit.

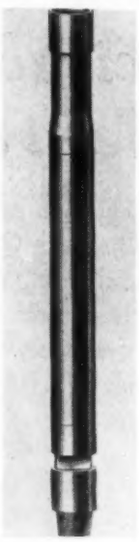
The Alco underreamer has three sets of roller cutters which rotate on eccentric bushings mounted on the mandrel. Bushings for the middle set of three cutters are keyed to the mandrel and held at all times in an off-center position, while the bushings carrying the upper and lower sets of cutters are free to rotate on the mandrel approximately half a turn. The mechanism controlling expansion and release of the cutters consists of special designed latches positive in operation.



*Alco Bit and Roller Reamer*



*Alco Underreamer*



*Alco Automatic Weight Control*

The Alco rotary roller reamer has cutters machined from special alloy steel and heat treated under electrical temperature control to an exact degree of hardness. The rollers are divided in the center and slip rings are inserted between the roller ends and the bearing shoulders of the body to reduce wear and to promote free rotation. The two large bearing pins are removable only from above, and are locked in place by small pins which enter from the inside of the collar, and cannot work out. The reamer body is a high grade steel casting and its oval shape leaves plenty of room for free passage of the circulating mud.

## J. A. Campbell Company

J. A. Campbell Company is showing actual working models of Campbell oil froth absorbers to be opreated by compressed air and illuminated by concealed electric lights. A complete demonstration through glass cylinders shows the actual workings of the absorbers. Various types of C&B tank equipment manufactured by the Campbell organization also is on display.

## The Wm . Powell Company

### VALVES

The Wm. Powell Company, Cincinnati, is showing a complete line of bronze, iron and steel valves in globe, angle, check, gate and safety patterns, as well as special alloy valves of chrome nickel steel. In addition, a full line of appliances particularly adaptable for oil well, field and refinery service, is displayed.

## N. A. Strand & Company

### FLEXIBLE SHAFTS AND EQUIPMENTS

N. A. Strand & Company, Chicago, are showing sizes of machines running from one-eighth to two horsepower, all motor-drive flexible shaft outfits, made in various sizes for grinding, polishing, rotary filing, sanding, drilling, screw driving, nut setting, scratch brushing, and for many other classes of work where a portable flexible shaft drive is adaptable.

## Celco Oil Well Survey, Inc.

### OIL WELL SURVEYING APPARATUS

Celco Oil Well Survey, Inc., Los Angeles, is displaying the Celco inclinometer, an oil well surveying apparatus. The Celco sub is placed in position, and the Celco inclinometer dropped from the top into the sub, where it remains until withdrawn. Since it is kept parallel with the drill pipe, it eliminates errors between angle of bottle and drill pipe, the angle recorded being the actual angle of the drill pipe as the point of sub location.

## Crane Company

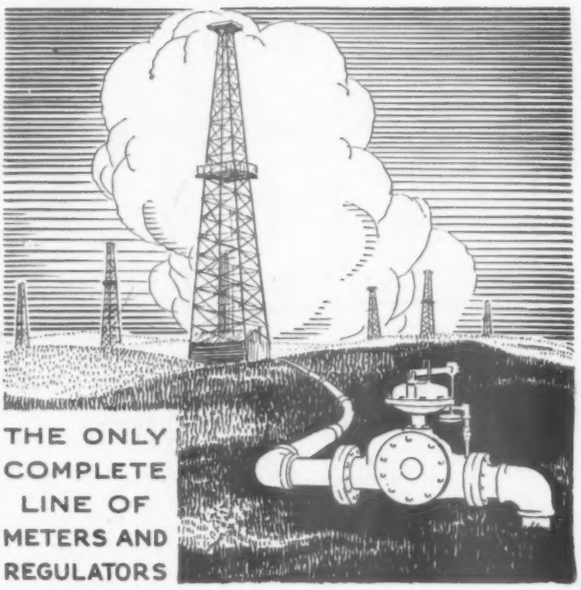
### VALVES AND FITTINGS

Crane Company, Los Angeles, is showing a complete line of Crane cast steel material including valves and fittings, drilling through and manifold valves in alloy cast steel, and power-operated valves. In addition a complete line of material other than steel, for the petroleum industry, is on display, as well as valves for natural gas lines.

## Midwest Piping and Supply Company

### MIDWEST BALL JOINT AND "GLOBACK" JOINT

Midwest Piping and Supply Company, Los Angeles, is showing its special Midwest ball joint for hot oil, and its new Midwest "globack" joint for high pressure steam or oil, power and industrial plants.



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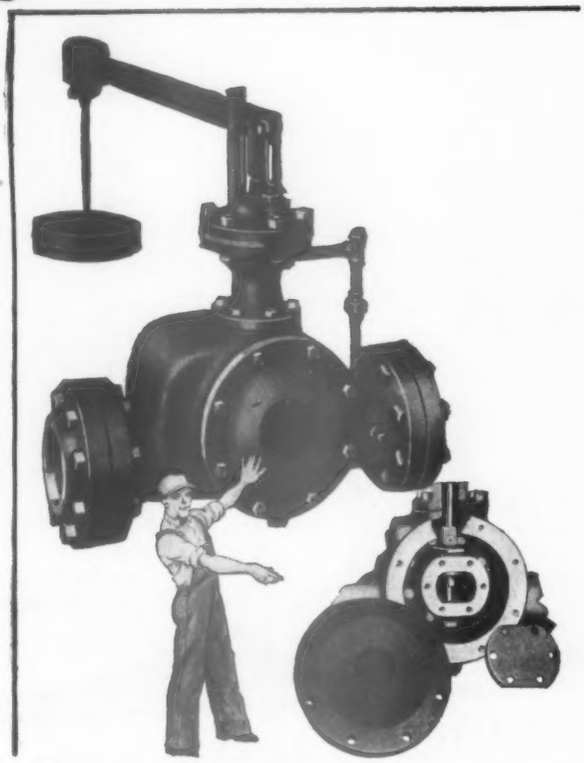

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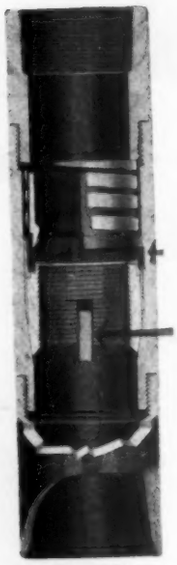

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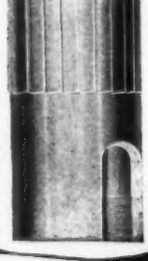

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*Section of mosaic map showing junction of north and south forks of Llano River. In this region some of the most beautiful scenery of Texas is to be found. Town of Junction appears in foreground. White line is location of pipe line of Texas Pipe Line Company. Photograph taken from altitude of 10,000 feet, scale 1-inch equals 1000 feet.*

# Aerial Photography Facilitates Pipe Line Location

By JACK LOGAN
*Staff Representative*

ALONG with numerous other advancements in the science of building pipe lines during the past few years has come the practical application of aerial photography in the surveying that is required, as demonstrated through the pioneering work of this nature done by Texas Pipe Line Company in 1928 on its trunk line from New Mexico and West Texas to the Gulf Coast.

E. H. Catlin, chief engineer of that company, says that he was dubious as to the value of aerial maps when they were first considered for use on the West Texas line, having had no previous experience with them, but that he soon became convinced of their practicability through some preliminary work; and now, following the favorable results obtained through aerial survey of a 260-mile section of that West Texas line, he endorses the use of aerial maps for pipe line location through any rough country.

The 260-mile section of the route which was surveyed from the air extends from San Marcos in Central Texas to Iraan (Yates pool), Pecos County, West Texas, and is a rough, broken region, covered with rocky hills and badly cut by canyons —a more or less inaccessible country of which there were very few good maps available for use in connection with construction of the pipe line.

Mr. Catlin received orders to make a survey for the location of this line from Houston to Monahans, Ward County, in June, 1928, and it was imperative that the survey be completed at the earliest date possible. From Houston to San Marcos the location of the line was relatively easy, and was made by field parties. The rough country from San Marcos to Iraan, however, was surveyed by means of the aerial photographs, made by the Edgar Tobin Aerial Surveys, San Antonio, in a specially constructed plane manned by an efficient pilot and observer-photographer. The actual survey of the Houston-Monahans route was started June 20, 1928, and completed August 15, 1928. The total distance included was 572.89 miles. The use of the mosaic maps made from the aerial photographs, according to Mr. Catlin,

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**Regulates well pressure in process of cementing and mudding off wells of excessive volume.**

**Prevents the loss of oil or gas while bringing in new wells, through pressure control.**

**Packing mechanism is positively accurate in operation.**

**Split casing rings can be placed around the casing or pipe while suspended between the top and bottom points of suspension above the surface line in the same manner as ordinary casing clamps.**

**Lug construction affords easy handling with casing outfits and elevator links; starts long strings of casing easily.**

**Minimizes leakage and maintains well pressure on pumping wells.**

**Suspends long strings of casing at any depth.**

**Full column of fluid or gas afforded by maximum inside diameters.**

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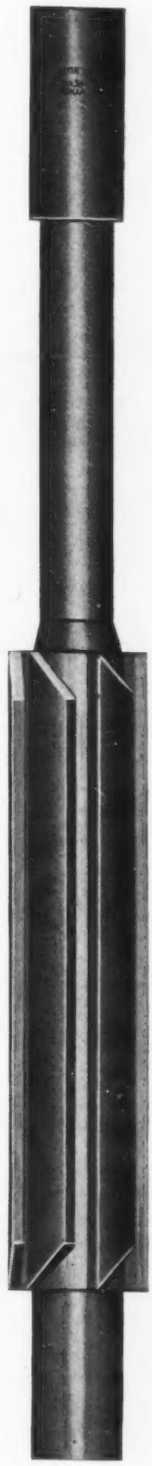

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*Speed – Safety*

*Straight Holes*

*Minimized Depreciation*

HONEST TOOLS

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*Ground view of rugged section along the pipe line route that was surveyed from the air. Four miles west of Junction station*

saved at least a month's time in locating the line, and at the same time made it possible to obtain a location most suitable for construction and maintenance.

### Photography

The history of aerial photography has been more or less contemporaneous with the development of the aeroplane. Both were developed rapidly through the exigencies of the world war. In aerial photography, use is made of a camera which employs roll films, and which automatically snaps a series of photographs which are subsequently laid out on a flat surface and overlapped to form a complete picture of the earth covered. The camera is mounted on the plane with the lens pointing downward through an opening in the fusilage.

To obtain best results the photographs must be taken during clear, sunny weather by experienced pilots and cameramen using the finest aerial and photographic equipment. The camera must be maintained at the same altitude all the time and pointed directly vertical, as is possible through advancements in aeroplane construction which enable the pilot to fly at uniform altitude and with an even keel. Finally, the laboratory workers must be trained and must be careful and accurate in putting the numerous photographs together to form the finished mosaic map.

The elevation at which the plane is to be flown depends upon the scale of the map desired. To make a mosaic map on the scale of one inch equals 1000 feet, the scale used in the surveying of the Texas Pipe Line Company, the pictures are taken from an altitude of 10,000 feet. Each photograph is nine inches by seven inches in dimensions, the nine inches being the width of the film roll. The exposures are so timed that they overlap about 60 per cent, and the pilot plots his flight lines so that the strips overlap about 50 per cent. Thus the net effective part of each exposure is only about one-fifth of the picture. The exposures are numbered when they reach the laboratory, and the prints are put down numerically in working them into the finished map. As they are matched together, the prints are glued to a card board base. Dovetailing into one another, they give a vertical view of the whole area covered, the portions which overlap being torn off.

### Costs

When completed, the mosaic of the West Texas pipe line route made a roll 100 feet in length. It covered a strip four miles wide for most of the distance, but some of the rougher sections of the country were covered with a strip eight miles wide. In all a total of 1447 square miles was photographed. According to Mr. Catlin, the cost of the mosaic maps ranges from $22 to $30 per square mile, depending upon the location and nature of the country involved, and the scale used.

While the mosaic under the naked eye shows only the general topographical features of the country, it may be placed under a stereoscope and by that means be given relief. Through the magic of the stereoscope the hills, valleys, rivers, vegetation, houses, and even fence posts stand out in clear relief, and one is reminded of the old fashioned stereoscopes of the parlors of yesterday, which would transform dead-looking pictures into almost real scenery and people.

Studying the completed mosaic in his office, the engineer has before him practically as comprehensive and vivid a view of the terrain as if he were actually looking down on the ground from the innumerable vantage points traversed by the aeroplane. He can pick out the high ground and the low, the streams, highways, and fence rows, and the towns and trees and fields. The route of a proposed pipe line is first indicated roughly by a string tacked over the map, and then the mosaic is studied more closely, section by section, and the string is moved around by additional thumb tacks to conform with all the natural advantages of the terrain. Finally the exact route decided upon is drawn in.

The location of the line is thus practically settled through use of the aerial map, and the field party has only to stake the line, look out for minor obstructions, get ownerships and "tie-ins," so that tracings and right of way lists can be prepared.

The saving in time by use of aerial photography in comparison with the work of field parties encumbered with camp and pack equipment is great. There is clear, uninterrupted vision for the aerial surveyor, no running up against a stone wall and the inevitable backing up and re-running a new tangent, as sometimes obtains in field party expeditions.

Furthermore, the aerial surveyors, from their lofty perch, could clearly observe and take the shortest route, and consequently large savings were effected in materials and construction work as well as in time. In addition, the aerial survey enabled the engineers to pick out the most easily followed line—around instead of over the highs, between peaks, down valleys, across wide flat table lands — cut down the number of booster stations required, and provided an easier path for the pipe line gangs in the soft earth rather than through rock, where possible.

It is estimated that the use of aerial photography on the West Texas line saved the Texas Pipe Line Company approximately one-half million dollars in materials and construction work alone. In addition there was the economic saving of from one to two months time gained in completing the project. Still another saving was recorded in the amounts of construction bids submitted to the builders of the line by the pipe line constructors. It was found that the bids based on the aerial survey were substantially lower per mile than previous bids on other lines where the routes were surveyed by field parties without the aid of the aeroplane. Again the route surveyed by aerial photography clearly indicates that the line will be more easily and economically maintained.

A rather startling feature of the work came to light when the various pipe line contractors rode or walked over the air route. They were asked to offer suggestions as to probable or profitable changes in routing, a quite common practice in pipe line work, and it developed that not a single contractor suggested any chang

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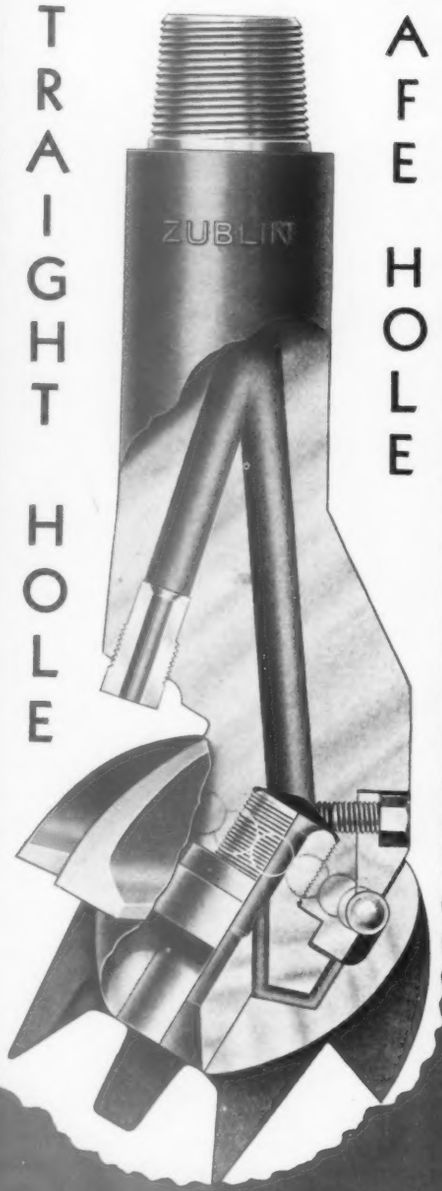


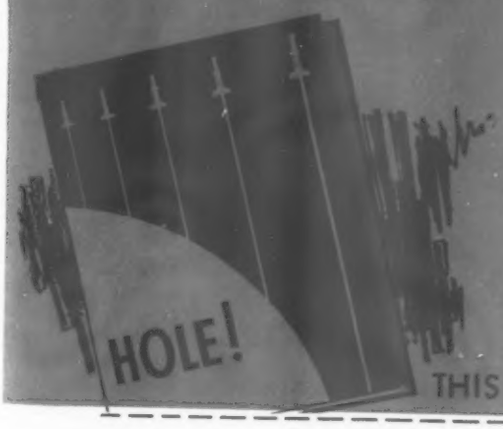


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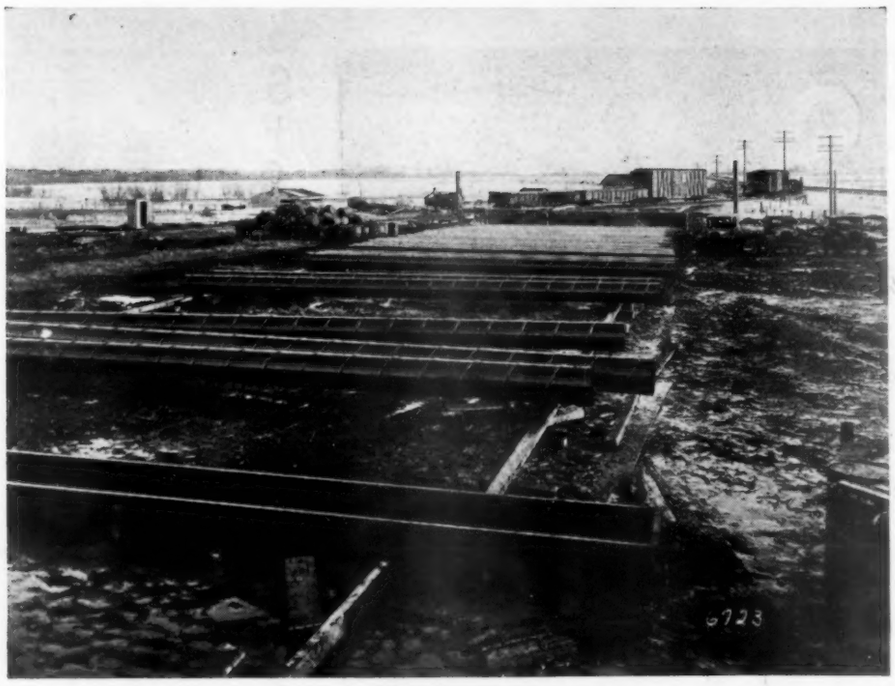

*Close up of priming vat with rack in background, and hot vat at far end of the rack*

# Salt Water Disposal Line Coated Inside and Out

By WARREN BAKER
*Staff Representative*

A VERY interesting, new and highly important feat connected with the building of the operators co-operative salt water disposal line from the Oklahoma City field to the South Canadian River area is the coating of the pipe on the inside with a protective material to prevent corrosion. As far as is known this is the second attempt to combat the highly corrosive elements contained in salt water by this method in the Mid-Continent oil region, if not in the United States.

The first attempt was in Gypsy Oil Company's salt water disposal line from the Wright pool of Sedgwick County, Kansas. This line has been in operation one and one-half years and apparently is highly successful, and it was not laid out on nearly as elaborate scale as the present work at Oklahoma City.

Owners of wells producing from the Arbuckle limestone horizon in the Oklahoma City field have been experiencing an increasing intrusion of salt water, until the disposal problem has become quite an important one. Some of the salt water produced in the pool has been handled by Martin Process Salt Company, but this company's plant is not large enough to care for the entire field's output, which amounts to many thousand barrels per day. Consequently the companies have found themselves confronted with a serious problem in getting rid of the salt water.

Several companies, principally Indian Territory Illuminating Oil Company, Prairie Oil & Gas Company and Sinclair Oil & Gas Company have undertaken the building of a salt water disposal pipe line, running from the Oklahoma City field to the South Canadian River area. A farm has been purchased at the latter point and the plan is to dig several large pits or vats in which to run the salt water. In these pits the salt will be permitted to settle out of the water. Now, it is reported, that a salt plant may be established at the lower end of the line, but no definite announcement concerning this development has been made.

### Several Engineering Problems

After deciding on the pipe line came the important engineering problem of protecting the pipe in some manner so as to prevent it from "corroding to death" from the chemicals in the salt water. Hill, Hubbell & Company division of General Paint Corporation undertook this end of the problem. This company had supplied materials for coating the pipe laid in the Wright pool disposal line. Charles W. Walker, engineer, and H. D. Bruce, research chemist, for the company at Tulsa, designed the methods for handling the pipe and seeing that it was properly coated with Biturine primer and Biturine enamel, products of the company. It was not only necessary to coat the outside of the pipe, which is so often done, but more important to coat the inside.

In applying the protective material a crane lifts the 40-foot, 20-inch pipe, weighing 1409 pounds per joint, into a priming vat which holds 636 gallons of primer material. After being covered with the primer the pipe is lifted by the crane and tilted to one end to permit it to drain. From this point the pipe is placed on a rack, where it is rolled across, after drying, to a second crane which picks it up and places it in a hot vat filled with a hot coating.

This hot vat is 45 feet long, 30 inches wide and 30 inches deep. It is raised from the ground to permit the installation of a gas furnace beneath, which keeps the coating fluid at the proper temperature, 400° F. It is very important that the temperature be kept to this degree of heat so as to keep the coating thin enough to apply evenly and still not so hot that it would be so thin as to drain off before it sticks to the pipe. In order to be sure that each joint of pipe is properly coated a stop-watch is kept on hand and each

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joint is permitted to stay submerged into the coating for about 30 seconds, 10 seconds of which it is completely submerged.

Some skepticism was expressed at first by many that any organic material could be heated continuously without breaking down or decomposing. But the furnace beneath the hot vat has been going constantly for 20 days, night and day, with the exception of one day when rain caused a shut-down. The coating still shows no signs of decomposing. The night work at the pipe coating plants permits it to keep up with the pipe layers.

A kettle is located near this hot vat. It is known as the melting kettle. With each joint of pipe that is lifted out of the hot vat comes between 280 and 300 pounds of material. This must be replaced, as it is necessary to keep the level of the coating sufficient to permit complete submersion of the pipe. The coating turned into the hot vat from the melting kettle must also be of the same temperature to keep from cooling the temperature of the coating fluid in the hot vat.

### Unbroken Even Coating Obtained

The complete immersion of the pipe gives a chance for all air bubbles to be washed away, giving an even, unbroken coating. The timing of each joint dipped assures that a proper thickness is secured, which is about 3/32 of one inch.

From the hot vat each joint of pipe is placed on another rack by the crane. This rack has a series of rollers. Here two men constantly turn. This action prevents the settling of the coating to any one side of the pipe. This operation is continued for about five minutes, during which time the hot coating has cooled and hardened to an extent that it will not run off the pipe. During this process each joint is carefully inspected to see that every spot is covered. At night such inspection is done by a light. The inspection of the interior of the pipe is the most important and difficult.

The joints of pipe are then rolled across to the other end of the rack, where they are placed on trucks that carry them to the field, alongside of the pipe line ditch. Before being placed in the ditch another inspection is made to see that handling has not chipped any of the coating and that every spot is covered.

The pipe dipping plant handles about five joints of pipe per hour. The ditch is being dug at the same time the pipe is being coated, and the laying of the pipe and back filling of the ditch going on at the same time.

The line now being laid is the main line and will be eight miles of 20-inch steel pipe. In addition a number of gathering lines are to be laid. Already more than 600 joints of pipe have been dipped and the line is nearly two-thirds finished.

The Oklahoma City salt water line disposal line is expected to be even more successful than the one laid in the Wright field, because of the previous experience with the problem and because of the additional time in which to prepare for handling the pipe. It should relieve the Oklahoma City operators from their salt water disposal problem, as a 20-inch line can handle many thousand barrels daily.

---

Houston.—Total volume of natural gas produced by and received by United Gas Company under exclusive gas purchase contracts during 1929 was 46,036,607,000 cubic feet, an increase over the 1928 figures of 7.87 per cent, or say 3,359,911,000 cubic feet, according to a statement made at the offices of the company here.

Of the 46 billion cubic feet produced and received during 1929, as much as 19,570,761,000 cubic feet was directly produced by United Gas Company's own subsidiaries from their own leaseholds. This volume represented an increase of 1,597,922,000 cubic feet, or 8.89 per cent over 1928. Gas purchased under exclusive gas purchase contracts totaled 26,465,846,000 cubic feet, an increase over 1928 of 1,761,989,000 cubic feet, or 7.13 per cent.

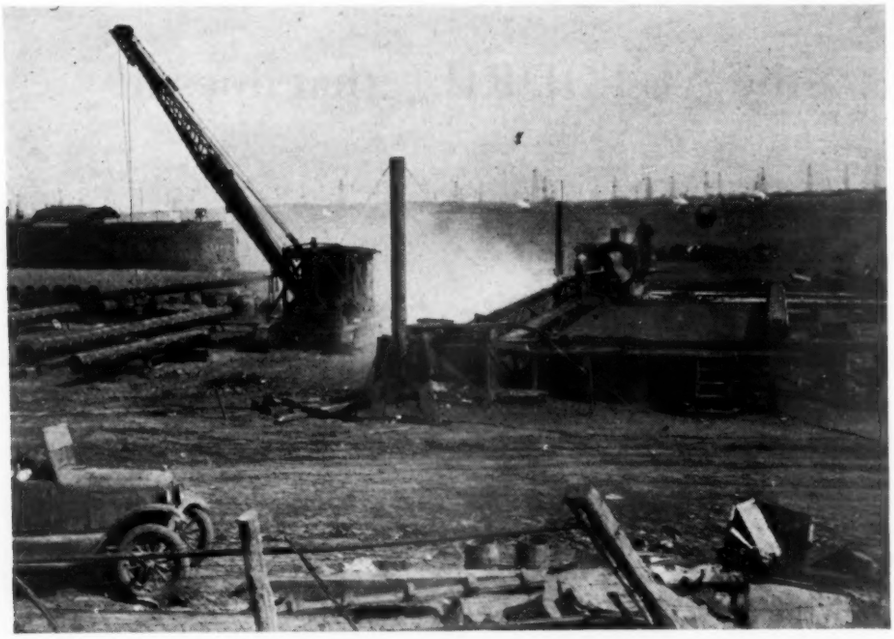
United Gas Company sales during 1929 reached 45,656,201,000 cubic feet, an increase over sales made during 1928 of 3,905,764,000 cubic feet, or say 9.36 per cent. The sales movement was divided in 1929 as follows: domestic sales 4,264,580,000 cubic feet; commercial, 515,049,000 and industrial, 40,876,572,000 cubic feet.

Meters in service throughout the United Gas system at the end of 1929 totaled 85,931, a net increase of 10,748 during the year, or an increase of 14.3 per cent when compared with the number in service at the close of 1928.

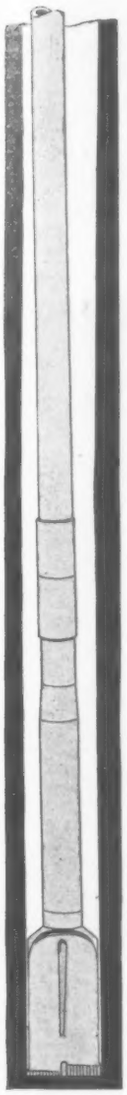
To supply this steady expansion of its service, United Gas Company, through its subsidiaries, has, in the North Louisiana fields, an estimated company reserve of 189 billion cubic feet; and in the Texas coastal fields the estimated reserve available to the company is 350 billion cubic feet.

Summing up, the estimated gas reserve available for the company's customers can be placed at 539 billion cubic feet.

During February the company's sales throughout the system was in excess of one billion cubic feet daily.



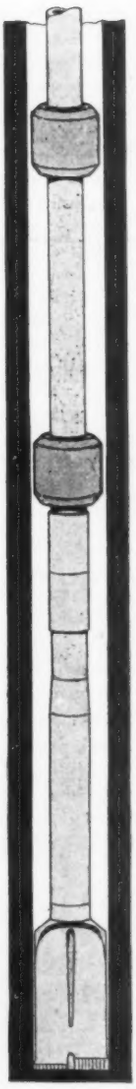
*Picture showing crane lifting a joint of pipe from the priming drying rack. Immediately to the right of the crane is the hot vat, right back of that the hot kettle, and continuing to the right is the rack on which they are placed when taken from the hot vat to dry and then be loaded on trucks. The Oklahoma City field in the background*



# *This* is the way to drill *crooked* hole

AND

# *this* is the way to drill *straight* hole



## Now drill in open formation safely

**Instead of wandering "off center" and following the line of least resistance your drill will dig straight down if the drilling string is supported and protected with Bettis Drill Stabilizers. Without support, the string may have a tendency to corkscrew and set up vibration that rapidly fatigues the steel, pounds the formation and may lead to caving. The application of Bettis Drill Statilizers keeps the drill pipe and drill stem in proper alignment by cushioning the entire line from the bottom of the casing to drill. Just as Bettis Protectors are the necessary protection within the casing, these Stabilizers are equally necessary in open hole.**

*Ask for new literature*

*View of Drillers in Long Beach field ready to install Bettis Drill Stabilizer on string.*

# Bettis Drill Stabilizers

FULLY PATENTED

"Best bet yet!"

**Patterson-Ballagh Corporation**
Insurance Exchange Building
Los Angeles

*Texas and Gulf Coast Distributors:*
BETTIS SALES CO., 616 Public National Bank Bldg., Houston

*Oklahoma Distributors:*
BAILEY & BECKER COMPANY, 410 Thompson Bldg., Tulsa
New York Office, 39 Cortlandt St.

*Carried in stock at:* Los Angeles, Santa Fe Springs, Ventura, Kettleman Hills, Bakersfield, Coalinga, Long Beach, Tulsa, Houston, Wink, Texas; Calgary, Alberta, Canada; New York City.

# Extensive Gas Line Construction in Rocky Mountain Area

(*Continued from page 82*)

built during 1929 consisted of the following:

116.6 miles of 18-inch pipe from Green River, Wyoming, to Coalville, Utah.

31.9 miles of 16-inch pipe from Coalville to Salt Lake City, Utah.

42.1 miles of 14-inch pipe from Coalville to Sunset Station, which is about eight miles south of Ogden, Utah.

Wasatch Gas Company has so far built the following distributing lines:

West and South of Salt Lake City:

8.2 miles of 16-inch pipe

16.6 miles of 12-inch pipe supplying Garfield and Magna, Utah.

6.0 miles of eight-inch pipe supplying Murray and Midvale, Utah.

1.9 miles of two-inch pipe supplying Sandy, Utah.

North of Salt Lake City:

5.6 miles of 14-inch pipe

27.3 miles of 10-inch pipe, with shorter lines feeding the towns of Bountiful, Centerville, Farmington, Kaysville and Layton.

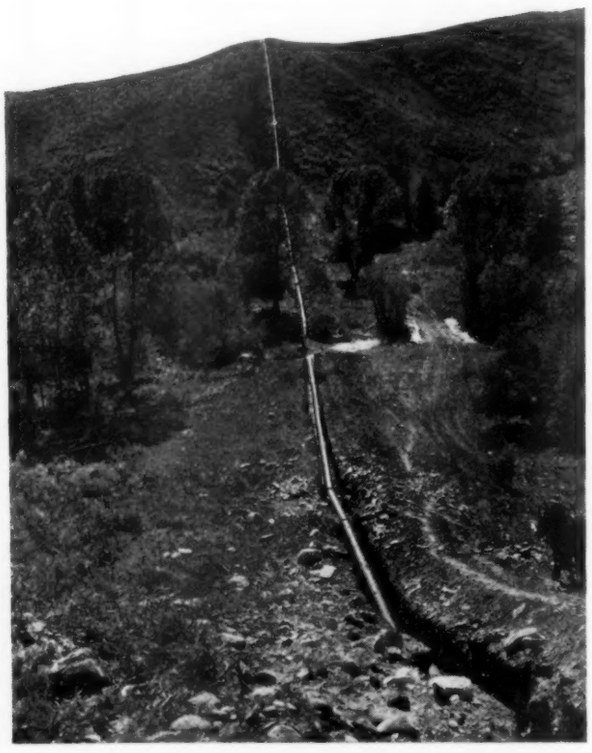
7.9 miles of 14-inch pipe from Sunset Station to Ogden, Utah.

Utah Gas & Coke Company distributes the gas within the city limits of Salt Lake City, while the Ogden Gas Company does likewise in the city of Ogden. Officials of the Wasatch Gas Company hold the same positions in the two aforementioned companies as they do in the Wasatch company.

It is very likely that before the end of 1930 the line will be extended to Provo, which is the largest city in the state south of Salt Lake City. The city commissioners of Provo late in December, 1929, voted a 50-year franchise to Western Public Service Corporation for the distribution of natural gas in their community, and it is understood that negotiations are now under way for the purchase of Utah Valley Gas Company, which is now supplying the Provo area with artificial gas. Applications for franchises in other towns to the south of Sandy, Utah, have been made, and as rapidly as the franchises are granted it is likely that the line will be extended.

During the present year it is also planned to extend the line from Ogden to Pocatello, Idaho, distributing natural gas to cities and towns in Northern Utah and Southeastern Utah. The line will be about 200 miles long, and will cost about $3,500,000. The starting of construction on this line is being delayed pending a decision of an Idaho commission upon the matter. Some Idaho citizens have protested against the proposed line, asking that the franchise be delayed until the completion of a test well for gas now being drilled on the Horseshoe Structure near Idaho Falls. A decision is expected within the next month or two. The proposed line will be of 10 and 12-inch pipe, but it has not been definitely decided as yet whether it will pass through Bear River Canyon and Malad Valley, or across the ridge and through Cache Valley.

*Measuring Station, Salt Lake City, Utah*



*Eighteen-inch line in Utah. This hill has about 60 degrees pitch. Photo courtesy Utah Gas & Coke Company*

The Wyoming-Utah line was the first 18-inch arc welded gas pipe line to be laid. Details of the construction of this line, the source of the gas, and similarly related matters were given in the August 30, 1929, issue of THE OIL WEEKLY, pages 25, 26 and 28.

Late in 1929 the New York Oil Company completed a two-mile gas line from Muskrat Dome to the carrier line transporting gas from Sand Draw to Casper. The gas supply at Muskrat will be held for emergency use and as a reserve supply. The new line is connected with a 43,000,000-foot well in the Muskrat field that has a rock pressure of 1600 pounds. With this new line Casper is said to be assured of a permanent gas supply for 40 years or more. In the late fall of 1929, this same company completed the rebuilding of this Casper-Sand Draw gas line, in preparing the line for high-pressure gas transmission. About 75 miles of 10 and 12-inch line was effected.

As soon as weather permits a six-inch gas pipe line will be built from the Billy

# Columbia Nut & Bolt Company, Inc.

Bridgeport, Conn.

Columbia Devices to Keep Cars Moving



Columbia Lock Nut



Columbia Gib Nut



Columbia Castle Nut

Try them on your Lift Jacks, Spudders, Derricks, Motors and other vibrating equipment.

Columbia No. 26 Plate Nut Lock



Required on all Arch Bar Trucks by A. R. F.



These two sizes will fit all Arch Bars and Truck Bolts

Columbia products insure tight fastening

Keep Tight with Columbias



No. 265 Applied to Arch Bar Truck

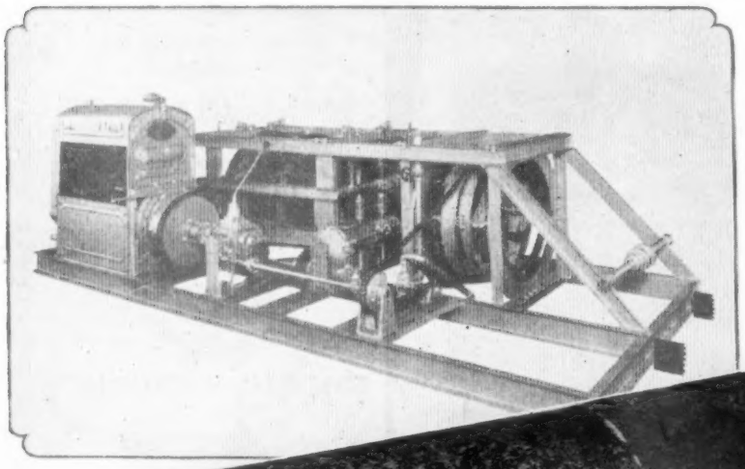
Made Since 1900





*"This up-side-downness is at the request of the advertiser: Nuts is Nuts"*

# REMOVAL of Millscale



*Section of a joint of pipe, slightly magnified, showing on one side corrosion and on the other how W-K-M Cleaning Machine has prepared the surface for a priming coating.*

MILLSCALE—the cause of most pipe-line losses—forms, at the time of manufacture, when pipe is exposed to the oxidizing effects of air. Apparently solid at first, yet very brittle in its texture, millscale shrinks and cracks, due to uneven expansion and contraction. These minute cracks, expose the bare steel to air, and thus stimulate both corrosion and pitting through an electrolytic action. As a consequence of millscale, therefore, the life of pipe is generally decreased.

To prevent these deteriorating effects, millscale should be removed completely, because, in applying preservative coatings, to paint over millscale is obviously to paint millscale and not the pipe. Removal of these loosely adhering masses of scale prepares the surface of the steel for coating, by strengthening the cementing attraction between the pipe and the coating.

After years of research and experience in pipe-line maintenance, W-K-M Company is now in a position to furnish machines which mechanically remove millscale from new pipe, clean rust and corrosion from old pipe, apply priming coats of paint to pipe after cleaning, and equipment for wrapping pipe

These machines, which are made in both portable and stationary models, can be obtained in a range of types to take care of any kind of pipe maintenance work. The types include:

STATIONARY CLEANING MACHINE—*for conditioning both old and new pipe in the yard;* SEMI-PORTABLE CLEANING MACHINES—*to be hauled along the right-of-way;* TRAVELING TYPE CLEANING MACHINES—*for work on made-up lines of diameters from 3" to 12";* TRAVELING TYPE PAINTING

**W-K-M Company, Inc.**

INDUSTRIAL, PIPE LINE & OIL FIELD EQUIPMENT

*Cable Address* "WILKOMAC"

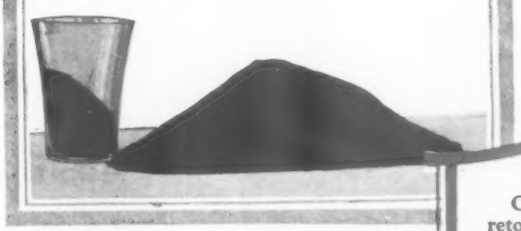
HOUSTON ▲ TEXAS

*Export Office*

74 TRINITY PLACE, NEW YORK CITY

# *Lengthens* Life of Pipe

## MILLSCALE



*Pictured above — The fine granular masses known as millscale, that accumulate on new pipe at the mills during the cooling-off period after the pipe has been welded. Loosely clinging to the surface, these particles prevent proper adhesion of the priming coat. The millscale shown was removed from a W-K-M Pipe Cleaning machine.*

*In the photograph below—Corrosion, the electrolytic process which in the United States annually exacts a toll of one hundred million dollars from the pipe-line industry. The flakes pictured here were removed from a joint of pipe which had lain underground in Oklahoma two years.*

**On this page are shown unretouched photographs of millscale and corrosion — the pipeline industry's greatest enemies. W-K-M Company, long pioneering in the prevention of corrosion, had produced and patented machinery which, by a positive, inexpensive, and practicable method, can control corrosion from the outset. Executives having pipe-line problems are invited to avail themselves of the assistance of W-K-M engineers. A request for a representative to discuss in detail this new method of corrosion prevention, is in no way obligating.**

## CORROSION

**MACHINES**—*which apply priming coatings on made-up lines;* **PIPE WRAPPING MACHINES**—*which lay coatings, either hot or cold, and wrap single joints of pipe on the yard;* **TRACTOR EQUIPMENT**—*for rotating joints of pipe, raising, lowering, and back-filling.*

W-K-M Pipe-Line Equipment is available on a rental basis for those having only occasional need of such equipment; or on a basis of outright sale. Servicing of new pipe is also available at certain pipe mills equipped with W-K-M Cleaning and Priming Machines. (Names on request). These mills are prepared to descale and prime new pipe at a very small cost, thus making possible for the buyer to obtain pipe which is immediately ready to go into the ground.

### Graphic Proof

Write for this booklet, which presents a step-by-step record of a complete demonstration, together with an astonishing array of microphotographs.

**W-K-M Company, Inc.**

INDUSTRIAL PIPE LINE & OIL FIELD EQUIPMENT

*Cable Address* "WILKOMAC"

HOUSTON ▲ TEXAS

EQUIPMENT

*Export Office*

74 TRINITY PLACE, NEW YORK CITY

Creek field in central Johnson County, Wyoming, to Buffalo and Sheridan, Wyoming, a distance of about 55 miles. The field, which was discovered several years ago, consists of seven completed wells with a shut-in production of approximately 200 million cubic feet of gas and one small shut-in oil well. It is controlled principally by the Consolidated Royalty Company, Western Exploration Company and Carter Oil Company, though the I. B. Smith interests of Cedar Rapids, Iowa, (to whom the pipe line construction permit has been granted), also have some acreage in this field. At present, Sheridan is supplied with artificial gas, but Buffalo is without gas.

A few oil gathering lines were laid in Wyoming during 1929 to connect up new wells with existing lines, but otherwise there was no oil line construction in the state. In the fall of 1929 the Utah Oil Refining Company erected 55,000 barrels of steel storage and laid gathering lines to this tank from six producing wells in the Black Mountain and Warm Springs fields some miles outside of Thermopolis, Wyoming. A production test was to be made and, if it proved satisfactory, Midwest Refining Company planned to lay a line to Lucerne on the Burlington railroad, a distance of about 25 miles. To date, however, nothing has been done in regard to the construction of such a line. Reports have been current that a line would be built from the Black Pool to Riverton, Wyoming, a distance of something like 40 or 50 miles, but it has been impossible to substantiate this rumor. The field is controlled by Continental Oil Company.

Prairie Oil & Gas Company which, with its subsidiary and associated companies, is very strong in this section, did not construct any oil lines or any oil storage during 1929, nor do they contemplate any such construction work during 1930. Inlinois Pipe Line Company did, however, take up its eight-inch line between the Big Muddy field and Casper.

### Colorado

The Public Service Company of Colorado, subsidiary of Cities Service Company and associated with the Colorado-Interstate Gas Company, extended its gas lines to a number of Colorado towns and industries during the past year. A 65-mile line was built from a point near Englewood, Colorado, to Fort Collins via Boulder. Ten-inch pipe was used between Englewood and Boulder, and eight-inch between Boulder and Fort Collins. The line was built at a cost of more than $1,500,000, and serves Longmont, Loveland, Golden and Littleton, in addition to the aforementioned towns. At Fort Collins the line ties in with Colorado-Wyoming Gas Company's (the same interests as control the Public Service Company of Colorado) line to Cheyenne, Wyoming.

Negotiations are under way with a number of other towns in Northern Colorado for supplying them with natural gas from Texas fields, and a franchise has already been secured from Berthoud. Companies affiliated with the Public Service Company of Colorado have owned the distributing systems in Boulder and Fort Collins, Colorado, and Cheyenne, Wyoming, for some years, so that there were no complications in bringing the gas to these towns. This company also has a gas line running into Fort Collins from the Wellington field, which line was laid several years ago.

In the southern part of the state the Colorado-Interstate Gas Company extended its system eastward to supply the towns of La Junta, Swink and Rocky Ford, a distance of about 50 miles, at a cost of approximately $250,000. At Swink a large beet factory is now being served with natural gas. Las Animas, Fort Lyon, Lamar, and other towns nearer the Kansas line will eventually be supplied with natural gas from Amarillo. At present work is going ahead on a 5000-horsepower compressor station at Devine, 10 miles east of Pueblo, Colorado, to cost approximately $600,000. The station is being built for the Colorado-Interstate Gas Company, which operates the northern end of the Amarillo-Denver gas line.

The city of Grand Junction, Colorado, in January of this year, granted a franchise to Fulton Petroleum Company of Conrad, Montana, for the installation of a natural gas distributing system in that town. The gas supply is to be obtained from the Garmesa structure, about 25 miles from Grand Junction, and it is reported that construction work will start as soon as weather permits.

Interests, whose identity has not been

OKLAHOMA PIPE LINE COMPANY

*Transporters of Crude Petroleum*

MUSKOGEE, OKLAHOMA

Reading Casing in use on Tidal Oil Company's University "I" Lease, Well No. 9.

# Let's Do Some Figuring—

The life of ordinary casing, records show, is only about four years. Reading 5-Point Casing has an average life of from ten to twelve years. Subtract four from twelve and you have the difference between ordinary casing and Reading 5-Point Casing!

Why does Reading 5-Point Casing last so much longer? Because it's made of Genuine Puddled Wrought Iron—the original, rust-resisting material with a proved record of endurance!

All Reading 5-Point Casing, Tubing and Line Pipe are made of Genuine Puddled Wrought Iron, produced only by the time-tested puddling process. To prevent mistakes, we put our name and indented spiral mark on every length.

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Reading pipe distributed by:
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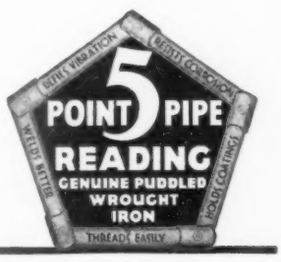



## *GENUINE* PUDDLED WROUGHT IRON READING PIPE

DIAMETERS RANGING FROM ⅛ TO 20 INCHES

*Science and Invention Have Never Found a Satisfactory Substitute for Genuine Puddled Wrought Iron*

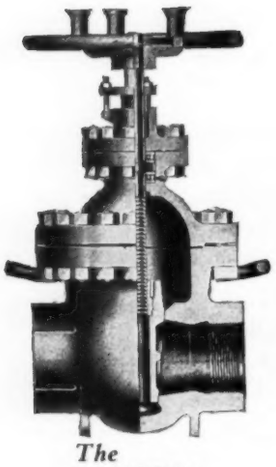
# ANNOUNCEMENT

WE are pleased to announce the appointment of the Taubman Supply Corporation of Tulsa, Oklahoma, as our factory representative for the Mid-Continent field, exclusive of the Gulf Coast district. A large and complete line of Chapman valves is being carried in Tulsa, Oklahoma City and Houston, in addition to prompt factory shipment.

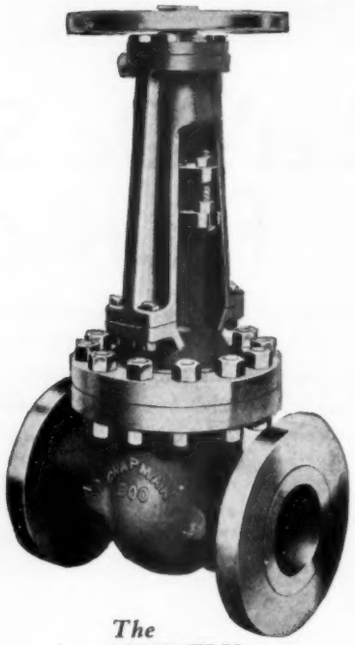
In line with the Chapman expansion program of manufacturing capacity, and to better serve the oil and gas industry, and after carefully checking ways and means of furthering our services in the Mid-Continent Field, we have found that the Taubman Supply Corporation has proven itself the livest and most dependable organization to represent us in this territory.

Taubman Supply Corporation will carry a large and complete stock of brass, iron and steel, standard and high pressure valves for every branch of the oil and gas industry. Our arrangement with the Taubman Supply Corporation will not penalize the oil and gas industry. Their prices will be the same as those of our factory branches.

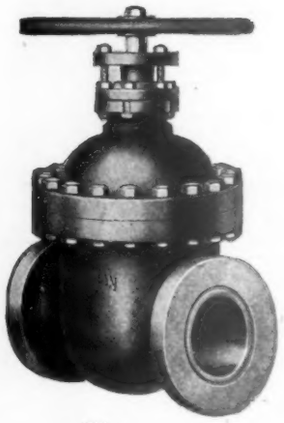
Our factory engineer, Mr. James B. Ford, representing us in the Mid-Continent Field, the past three and one-half years, as district manager, will continue serving this territory with the Taubman Supply Corporation in the capacity of Consulting Engineer. Do not hesitate to submit your problems. We are always willing and ready to assist you in every way possible.



*The* DRILLING VALVE



*The* REFINERY VALVE



*The* PIPE LINE VALVE

## The Chapman Valve Manufacturing Co.

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*Mid-Continent Factory Representative:*

TAUBMAN SUPPLY CORPORATION

*General Offices:* Tulsa, Oklahoma

# An *Announcement* of importance to the entire OIL & GAS INDUSTRY

**WE are pleased to announce our appointment as factory representatives in the Mid-Continent for**

## CHAPMAN VALVES

### *Known Wherever Good Valves Are Necessary*

We have found it necessary to have a complete line of valves to further Taubman facilities for better serving the Petroleum Industry with Quality, Quantity and Service.

After a thorough investigation of actual performance in the field and a personal inspection of the factory at Indian Orchard, Mass., by our president, Mr. Herman P. Taubman, in company with one of the Petroleum Industry's most competent engineers, we found Chapman Valves are made in one of the largest, best equipped and up-to-date valve, steel, iron and brass foundries and finishing plants in the country.

We are therefore fully and conclusively convinced that we are offering the Oil and Gas Industry the utmost in valve quality which measures up to the highest manufacturing standards.

**TAUBMAN SUPPLY CORPORATION**

*General Offices:* Midco Building
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OKLAHOMA CITY HOUSTON

disclosed, are seeking a natural gas franchise from the town of Craig, Colorado, in the western part of the state. It is rumored, however, that the ones seeking the franchise are the same parties who are drilling a test well near Baggs, Wyoming, about 2½ miles from the Colorado line. An interesting condition has arisen in Greeley, Colorado, where the town council has given a franchise to Standard Oil Company of Colorado, who intend to supply the town with gas from wells in the Berthoud dome. The same company is also seeking franchises from other towns in that area, in direct competition with the Colorado-Wyoming Gas Company, who already have the gas line from Amarillo extended partly upward to the northern part of the state, and will extend it further as fast as franchises are secured from the towns en route.

There was practically no oil pipe line or storage built in Colorado during the past year.

### New Mexico

The biggest construction work of the year in which New Mexico was involved was the natural gas line from the Jal area in Lea County, New Mexico, to El Paso, Texas. This line, which is approximately 200 miles long and which was built at a cost of about $15,000,000, was completed in the late spring of 1929.

In June, 1929, Pecos Valley Gas Company completed a line from the Artesia field in Eddy County, New Mexico, to the town of Artesia. Later in the year it put into operation a new eight-inch line to Roswell, a distance of 45 miles. The field gathering system for supplying this line consists of three miles of five-inch pipe and five miles of 3½-inch. Other New Mexico towns being supplied with natural gas by this same system are Clovis, Portals and Lovington.

Early in 1929 Mesa Grande Gas Company a subsidiary of the Hope Engineering Company, completed and placed in operation a six-inch line, 36 miles long, from the wells of Midwest Refining Company and Producers & Refiners Corporation in Northern New Mexico to Durango, Colorado, center of one of the world's largest silver mining areas. The Durango plant of American Smelting & Refining Company is the chief industrial consumer served by the new line.

Late in the year Southern Union Gas Company completed a line from the Kutz Canyon district in San Juan County, New Mexico, to the town of Farmington, New Mexico.

The year 1930 will probably see the towns of Las Vegas, Nevada, and Santa Fe and Albuquerque, New Mexico, being supplied with natural gas. About six weeks ago, the following companies submitted applications to the city of Albuquerque for franchises to supply the city with natural gas: Virginia-Mex Gas & Oil Company; Pecos Valley Gas Company, which proposes to pipe gas from Lea and Eddy Counties in the southeastern part of the state; and Southern Union Gas Company, which proposes to bring the gas from the San Joan Basin in the northwestern part of New Mexico.

Oil lines built in New Mexico during the past year were as follows:

Five miles of 10-inch welded line built by The Texas Pipe Line Company from the New Mexico boundary to the Texas Production Company's wells in the Jal field.

Forty miles of six-inch screw line pipe laid by The Texas Pipe Line Company from the Jal field to the Lea pool. This system was continued with a four-inch screw line up to The Texas Production Company's Lynch 1 well, a mile to the northwest of the Lea wells.

Ten miles of eight-inch screw line pipe laid by Humble Pipe Line Company from the Texas boundary up to Skelly Oil Company's Joyner in the Jal field and to its own wells in that area.

During 1930 it is likely that some company will build a line to the Hobbs pool, which at present has no pipe line outlet. Humble Pipe Line Company or The Texas Pipe Line Company are the logical companies to construct such a line. For the former company it would mean building about 40 miles of line from the Lea pool; for the latter company, about 20 miles of line to a connection with its line into the Lea pool.

Some steel tank storage was built in New Mexico during the year, among which is to be mentioned two 55,000's built by The Texas Pipe Line Company at its Jal station, and a 37,500-barrel storage tank for holding the oil from its Lynch wildcat producer in Section 34-20s-34e, Lea County.


# IVERSON SPECIALTY COMPANY

SUBSIDIARY OF

**IVERSON TOOL COMPANY**

Announces the Opening of a Store at Oklahoma City
Carrying a Line of Rotary Specialties, Supplies,
Wire, Lines and Cordage

**SOLE DISTRIBUTORS IN OKLAHOMA FOR BREWSTER PRODUCTS**

**IVERSON SPECIALTY COMPANY**
BUSINESS EXCHANGE BUILDING
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THE TEXAS PIPE LINE COMPANY
608
- Aluminum Foil keeps Heat off —
keeps Profits in
Reflecting the sun's rays, keeping out heat, aluminum foil brings an entirely new kind of protection to oil storage tanks.
In an actual test by an important oil company in west Texas, the roof only of an 80,000 barrel tank was coated with Alcoa Aluminum Foil. The maximum temperature of the gas in this tank was 25 degrees below the maximum temperature in an exactly similar tank which was not coated.
The brightly polished surface of Alcoa Aluminum Foil reflects light and at the same time reflects heat. It is a real barrier to heat rays, preventing profits evaporating into thin air.
It is no more difficult to spread Alcoa Aluminum Foil than it is to hang wall paper. The cost is only a little higher than painting. Its great durability alone quickly pays for the job. A foiled surface is practically permanent.
The oil industry is using Aluminum Foil with excellent result on top and sides of storage tanks, on tank cars and to retard corrosion on pipe lines. We will gladly send you full information on the application, cost and many uses of Alcoa Aluminum Foil for the oil industry. ALUMINUM COMPANY of AMERICA, 2417 Oliver Building, PITTSBURGH, PENNSYLVANIA. Offices in 19 Principal American Cities.
ALCOA ALUMINUM
ROLLED INTO FOIL

# TECPRO

Technical Products is the originator of Foiling Adhesives and TecPro has been used for every commercial foil application of which we have any knowledge.

All Aluminum Foil Applications exhibited at the Petroleum Exposition at Tulsa last October were made with TecPro.

Every Application discussed and shown in lantern slides, motion pictures, etc., at the American Petroleum Institute in Chicago last December were TecPro Foiled.

In fact, every published picture of a foiled job has been one made with TecPro and in magazine articles Technical Products has been given full credit for their part in this remarkable development.

*Applying Aluminum Foil with TecPro*

The development of TecPro Foiling Adhesives made possible the application of Aluminum Foil to the Tank illustrated on this page.

TecPro is an adhesive that is impervious to weather conditions and will not deteriorate. Its qualities render it particularly adaptable to the application of Aluminum Foil to Metal or other surfaces.

Numerous foiled surfaces have withstood the cycle of the seasons ranging from winter's heavy sleet and zero weather, to the hot blasts of desert sandstorms with TecPro holding the protective surface of Aluminum Foil intact.

It was long known that a foil-clad surface keeps out the heat, minimizes evaporation, and is unaffected by most corrosive agents. But how to apply it was the problem.

TecPro is the answer to that problem.

Write for folder giving additional detailed information regarding FOILING AND TECPRO.

**Technical Products, Incorporated**
DALLAS, TEXAS

# Coates Pump Station
# Pride *of the* Empire System

EMPIRE Pipe Line Company's employes at Oklahoma City, Oklahoma, are justly proud of the growing proportions and increasing neatness and beauty of the Coates Pump Station.

The growing burden of handling more and more oil that was placed upon the small station has resulted in it growing in a very short time to a large one. From the start it was the largest single outlet for crude oil produced in the Oklahoma City field and through additions it has been able to continue in that capacity.

At times when the production of the fields was increasing so rapidly several building records were established in erecting various units of the station.

Early in 1929 after the Oklahoma City oil field had been opened late in 1928, Empire Pipe Line Company decided to extend its service into the new area. An eight-inch seamless, welded pipe line was promptly started with this decision. The line was slightly more than 40-miles long running from the Cimarron pump station, eight miles northeast of Guthrie, Oklahoma, where a lateral line connected with the company's main pipe line from El Dorado, Kansas, to Cushing, Oklahoma.

As the Oklahoma City field is very well adapted to the gathering of oil by gravity, the south end of the line and the pump station site were selected at a point five miles north of the field. The site selected was near the Greig siding along the Frisco right-of-way. A 12 and 10-inch gravity line was built along the east edge of the field to the discovery well. The station at first took the name of Greig, and only recently has it been changed to Coates in honor of Frank R. Coates of the New York office of Henry L. Doherty & Company, who is vice president in charge of petroleum and natural gas of the Cities Service Company.

In constructing the station two 4¾x24-inch motor driven pumps were brought from the Davenport pump station and one 10x18-inch motor driven suction pump was moved from the Lima, Oklahoma, station. For storage and running purposes two 10,000-barrel tanks from the Tonkawa, Oklahoma, station and one 15,000-barrel tank from the Waurika, Oklahoma, station were moved to the proposed site and erected. This program gave the new station a capacity of 22,000 barrels per day.

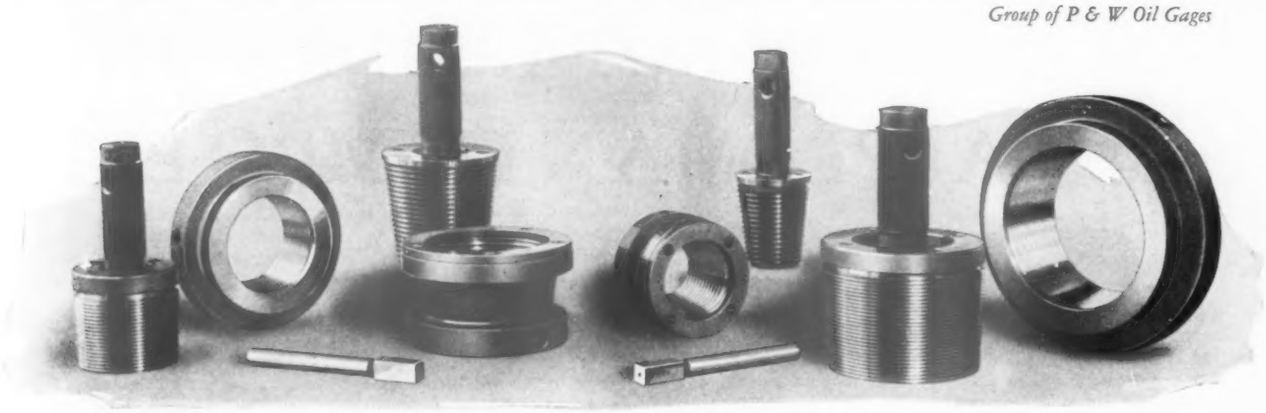
Late in the summer of 1929, when production in the Oklahoma City field began to increase and before any proration agreements among the operators were reached, it became necessary to immediately increase the line capacity out of the field. To meet this requirement two four-inch, three-stage centrifugal motor driven pumps were purchased and installed ready for operation, all within 10 working days. At the same time two of these units were set at a point midway between the Coates and Cimarron stations. This gave the Oklahoma City station, through the Empire Pipe Line Company, an outlet of 40,000 barrels of oil daily. In addition two of these centrifugal units were installed at a point midway between Cimarron and Cushing.

At the time this additional pumping equipment was being installed a tank building program was under way in which a new record for tank building was also established. Four 80,000-barrel storage tanks were ordered erected. The first one was completed and made ready for testing in 10 days after the arrival of the first shipment of steel.

An early start was made toward landscaping and beautifying the grounds and today the station presents the appearance of a real pump station beautifully kept up.

*Interior of Coates Pump Station*

*Group of P & W Oil Gages*



# If the A. P. I. had done nothing but this . . .

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| J. V. Redick | Tyler, Texas |
| Deep Test Oil Company | Beaumont, Texas |
| Smith & Hayslip | Houston, Texas |
| R. W. Townley | Houston, Texas |
| Mills Bennett Production Company | Houston, Texas |
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| Hamill Drilling Company | Houston, Texas |
| Navarro Oil Company | Houston, Texas |
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| Wolf & Laughlin | Houston, Texas |
| Albert Plummer | Houston, Texas |
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| Moon Oil Company | Vinton, La. |
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*Write for complete information.*

# B. K. APPLEMAN
BEAUMONT, TEXAS

# Protection of Buried Pipe Lines from Corrosion

(*Continued from page* 66)

be made in the case of coatings with which are incorporated effective corrosion inhibitors; but none of these have as yet afforded any conclusive proof of their value.

Fully as important as impermeability to corrosive agents is the ability of a coating to retain its impermeability under the conditions which it must encounter in service. Break-down of this impermeability may be caused by either chemical or mechanical action of soils. In the case of bituminous coatings, chemical destructive action is usually of minor importance.[2] Mechanical destruction by soil action, on the other hand, is of great importance in the case of bituminous materials, and is unquestionably a major cause for the failure in service of such coatings. General recognition of the importance of destructive mechanical soil agencies is due to Dr. Gordon N. Scott,[3] who coined the term "soil stress effect" as destructive of their action. Dr. Scott has described soil stress effects so thoroughly and clearly that no further explanation seems necessary. The term and its meaning are familiar to everyone interested in coatings for buried metal.

Judgment as to the merit of any protective coating for underground service can be based only upon its actual performance under service conditions. It is true that some preliminary estimate can be formed as a result of laboratory tests. Particularly is this true of laboratory tests which measure permeability to moisture; in the writer's somewhat extensive investigations of this factor, no coating which was rapidly penetrated by moisture in the laboratory gave satisfactory service underground. Such a test has considerable negative value in eliminating from consideration coatings which will certainly fail in service. However final determination can be based only upon performance on actual working pipe line structures. Even tests upon buried pipe nipples are of questionable value; the true method of this value of evaluation will be determined by tests now being conducted by the Bureau of Standards.

The following brief summary of the qualities of the more important classes of protective coatings is based entirely upon observation of the behavior of these coatings upon actual working pipe lines.

### "Cut-Backs"

Most bituminous coatings designed for application cold to pipe lines are asphalt or coal tar cut-backs, i.e., combinations of the bitumens with volatile solvents. Commercially available coatings of this type cover an almost bewildering range of properties and compositions. The differences among these cut-back coatings are caused by the use of different coal tars or asphalts, of different solvents or proportions of solvents, by the use of fillers of different types and in varying amounts, etc. Despite the wide diversity of materials belonging to this class of coatings, there is very little difference between their performance in underground service.

As a class, the cut-back bituminous coatings do not satisfactorily protect buried metal against the action of severely corrosive soils. The most usual cause for their failure to afford protection lies in their permeability to moisture. Probably less than five per cent of the cut-back coatings on the market afford even moderate protection against penetration by the cor-

[2]Charles Fitzgerald; "Corrosion and Pipe Line Coverings"; proceedings of the tenth annual meeting of the American Petroleum Institute, 1929. Part IV.

[3]Gordon N. Scott; "Field Inspection of Protective Coatings Applied to Oil and Gas Lines," proceedings of the tenth annual meeting of the American Petroleum Institute, 1929. Part IV.

FIGURE 4
*A series of coating tests on a line near Spindletop, Texas*

FIGURE 5
*This pitting took place under a pipe line coating and was caused by moisture penetration of the coating*

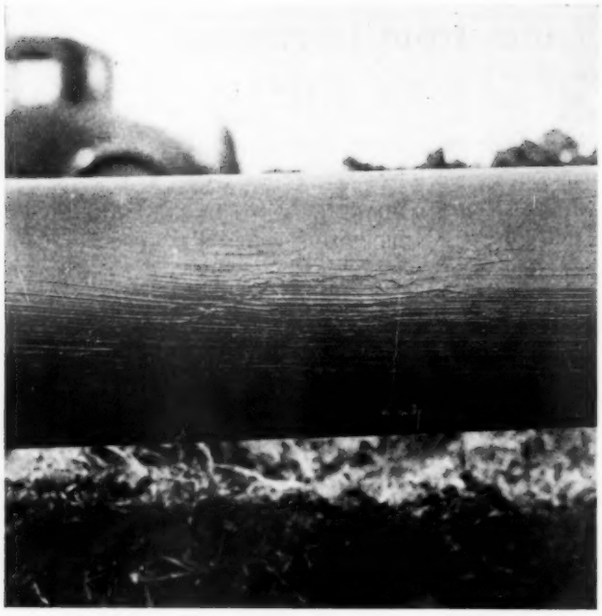

FIGURE 6
*A freshly applied grease type coating*

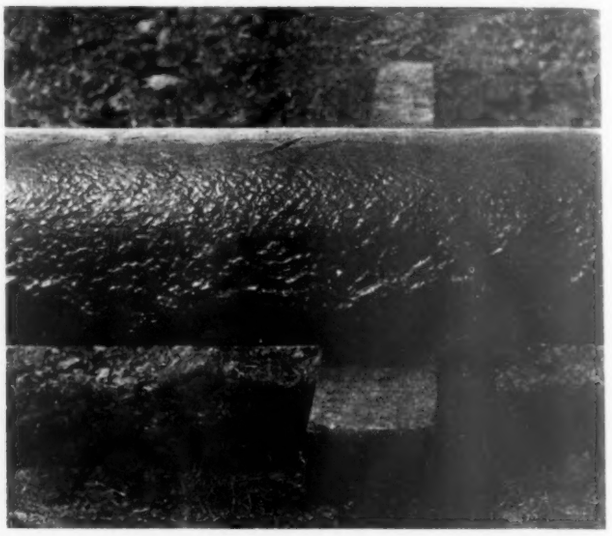

FIGURE 7
*The coating illustrated in Figure 6 after on hour exposure to the sun. The coating has flowed, leaving a part of the pipe surface bare*

of the few coatings of this type which do form impervious films, failure by soil stress action is usually extremely rapid. The reason for this lies in the fact that the coating films are extremely thin, and that even a very slight soil action will rupture them. Dr. Scott[3] reports upon the inspection of 54 applications of paints and cut-backs bituminous materials. The average age of coating was only 1.60 years and in 94.5 per cent of the inspections corrosion of the pipe was observed.

It seems certain that satisfactory application of cut-back coatings under severe soil conditions can be made only through the use of some type of reinforcement which will protect them against soil stresses. Even such reinforcement can be effective only when used in conjunction with cut-back coatings which are in themselves proof against penetration by soil moisture.

There are, of course, certain soil conditions under which some service can be obtained from cut-back coatings. There are soils of a moderately corrosive nature which do not cause severe mechanical distortion of coatings; in these, those cut-back coatings which are impervious will give a certain amount of protection. Under even milder corrosive conditions — in soils in which corrosion takes the form of a slow, general attack rather than a rapid pitting —the cut-back coatings may give good service.

Protective coatings compounded essentially of petroleum greases have been extensively used upon buried pipe lines. These coatings, in contrast to most of the bituminous cut-backs, are inherently impervious to penetration by moisture. To off-set this advantage, they afford no resistance whatsoever to soil stresses. For this reason, their utility as protective coatings in general underground service is very slight. An idea of the performance of such coatings may be gained from Table I, which summarizes results of the inspection of 42 locations on grease coated pipe lines in various portions of Texas.

Since these locations were selected at random, and without reference to corrosion conditions, they afford a fair measure of the performance of these coatings in general operation. Without going into detail, it may be said that a similar inspection of uncoated pipe lines of equal age over this same area would not disclose any more severe pitting than that which was observed on the grease coated pipe, and that the only apparent utility of the grease coatings has been in preventing superficial rusting of the pipe.

There is, however, one type of pipe line corrosion against which the grease coatings afford considerable protection. Under swamp conditions, where the pipe is buried in constantly wet, soft, mucky soils, such coatings have given excellent service. Under these conditions, an impervious coating remains upon the pipe, since there is no severe soil stress, and since the greases are not absorbed as they are by dry soils.

**Table I**
**Summary of Inspection of Grease-Coated Pipe Lines**

| | |
|---|---|
| Number of locations examined | 42 |
| Average age of coatings, months | 43 |
| Condition of coating:— | |
| Coating remains; number of location* | 17 |
| Coating completely disappeared; No. of locations | 25 |
| Rusting of pipe:— | |
| Pipe rusted; No. of locations | 28 |
| No rusting; No. of locations | 14 |
| Pitting of pipe:— | |
| Number of locations: | |
| Pits 1/64″ | 9 |
| Pits 1/32″ | 9 |
| Pits 1/32″ to 1/16″ | 8 |
| Pits 1/16″ to 1/8″ | 10 |
| Pits 1/8″ to 1/4″ | 6 |

*Includes all places where even slightest trace of coating could be found.

Because of the impermeability of the greases, they would be expected to afford excellent protection if protected against mechanical destruction by proper wrapping materials. Much work has been done along this line, but most of it has been confined to the use of soft cloth wrappings, which do not possess the mechanical strength necessary for resistance to soil pressure, and which rot out rapidly when exposed to underground conditions.

**Bituminous Emulsions**

Water emulsions of bitumens held in a dispersed condition by the use of suitable emulsifying agents have been somewhat used as coatings for underground pipe. The fact that these coatings can be applied to wet pipe gives them an important advantage over other types of bituminous coatings. In actual underground service, the asphalt emulsion coatings have not been at all successful. The probable reason for this is that they are extremely permeable to moisture; coalescence of the asphalt particles during drying of the film is apparently incomplete, and the resulting coating is porous. Incorporation of inhibitive materials effects some improvement, but does not serve to make the coatings satisfactory, due primarily to the susceptibility to soil stress action of the soft asphaltic films. A method occasionally employed involves the application of dry Portland cement over the asphalt emulsion; the cement is hydrated by the water from the emulsion, forming a hard sheath over the bituminous material. Such coatings, because of the ease with which they are penetrated by moisture, do not afford protection against soil corrosion. A more promising class of emulsion coatings would seem to be those recommended by a leading manufacturer of asphalt emulsions, and involving the admixture with the emulsion of neat cement slurries.

**Bitumens Applied Hot—Not Reinforced**

Applications of bitumens in the

[THE SIXTH OF A SERIES OF EIGHT AD-ITORIALS ON OIL]

# Like Finding Big Berthas

GEOLOGICAL departments have introduced within the last few years a modern "doodle bug" or "diving rod." Many who first scoffed at these geophysical methods for locating structures favorable for oil accumulation have since paid off in big figures for acreage these modern structure finding instruments have located.

■

One of the instruments used is a seismograph the improvement of which was greatly accelerated during the World war. It was used for locating big guns by indicating the extent and direction of sound beneath the surface of the ground. In geological exploration for oil the geologist must explode his own powder to send noise into the ground. If the sound waves hit rock, such as a dome or some other fault, they are deflected back to the surface.

■

A film of sensitized photographic paper records the exact time the shot wave is fired, determined by radio; the time of the arrival of the various seismic waves; and the time of the arrival of the sound of air wave. Calculations are made from these and other factors which give a fairly accurate picture of the formations in the area.

■

The tortion-balance method measures differences in density in sub-surface materials in terms of gravity differences. For example, the specific gravity of a salt dome would differ from that of the surrounding earth. This difference would be revealed by the delicate reactions of the tortion-balance.

■

Geophysical methods have located 56 salt domes in the Gulf Coast territory; 19 in Texas, and 37 in Louisiana. These new domes indicate that this area will be a continued and growing factor in the oil industry of the world.

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FIGURE 8
*Soil stress of a soft bituminous coating*

molten state to a suitable primed pipe result in bituminous films which afford greater protection than do those which are formed by the use of cut-backs or of emulsions. This greater protection is partially attributable to the fact that the coatings thus obtained are thicker than those usually resulting from the other methods, and also to the excellent adhesion and complete coverage which can be secured through a proper application of molten bitumen.

In general, satisfactory results are not obtained by the use of simple asphalts or coal-tars in this manner, since they do not, as a rule, possess all of the qualities which are essential. Excellent results are obtained by the use of the various proprietary pipe-line enamels, which are specially formulated for application in the molten state. These pipe-line enamels are combinations of various bitumens of proper characteristics, with suitable mineral filling materials. As a class, they form, when properly applied, impervious coatings possessing excellent physical characteristics.

Unfortunately, pipe-line enamel coatings are subject to severe distortion when mechanically stressed by soil action[4]. This distortion is frequently so serious as to rupture the coating, or to pull it so thin that it can be readily penetrated by soil moisture.

The physical properties of the various pipe-line enamels which are available, and this variation results in appreciable differences in their resistance to distortion by soil stress action. Manufacturers of such coatings are modifying their products in the light of experience with soil stress effects, and may be expected to develop enamels which in themselves offer a great resistance to mechanical distortion. Successful results have been reported with products based upon bituminous materials of higher melting point and lesser susceptibility to flow than other pipe-line enamels. If these properties can be imparted without making the product too brittle, and without sacrificing adhesion or impermeability, it should be possible to develop enamels which would be little affected by soil stress action. Others have attempted to develop coatings which are not subject to distortion by increasing the proportion of mineral matter very greatly, thus developing mastic coatings consisting essentially of solid particles cemented together with bitumen. The mastics are more difficult to apply than are the pipe line enamels, and have not yet been thoroughly tested in underground service.

**Reinforced Bituminuous Coatings**

The use of reinforcing wrappings in conjunction with bituminous coating materials finds extensive application. The older method for the use of reinforcing materials involved sticking them to the pipe by the use of suitable molten or cut-back bitumens, building up a coating layer of which the reinforcement formed an integral part. Coatings of this type are the familiar wrapped coatings. Coatings possessing almost any desired combination of properties may be built up in this manner. The adhesive bitumen may be asphalt of any desired physical nature, applied either molten or as cut-

[4]Scott, loc. cit.; Fitzgerald, loc. cit.

FIGURE 9
*Soil stress of a bituminous enamel coating*

FIGURE 10
*Cloth wrapper rotted after six months service*

# PROOFS

*of the*

## Effectiveness of Accident Prevention Work in the Mid-Continent Oil Territory

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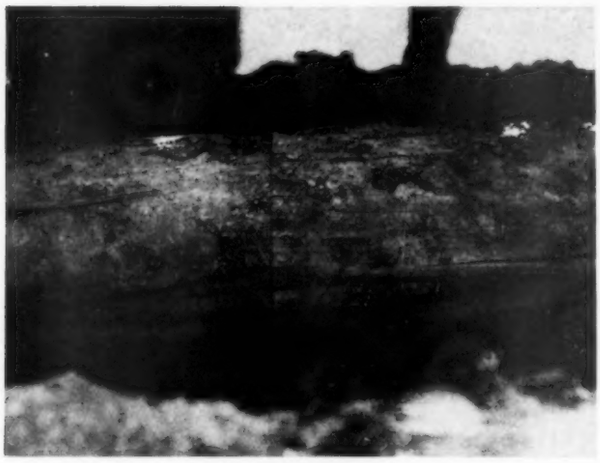


FIGURE 11
*Wood veneer applied to protect an enamel coating against soil stress*

back or coal-tar or coal-tar pitch similarly applied. A wide variety of wrapping fabrics have been used. Of these impregnated felts made up of asbestos, rag fibres, wood fibres, or the like have been most successful. Fabric wrappings such as burlap, muslin or specially woven materials have been rather widely used, but are not as satisfactory as the felts. The fabrics may be applied by various methods. They may be wrapped over the pipe in the form of long or short longitudinal strips or may be wrapped spirally. The latter procedure results in better coatings than are obtained by longitudinal wrapping. Wrapped coatings may be built up to any desired thickness by increasing the number of plys of wrapping fabric used, each ply being cemented to the underlying coating with a layer of bitumen. Thus, spiral wrappings involving up to three layers of a felt wrapping are rather extensively used.

Coatings of this class, when properly applied, afford very good protection. This is evident from the inspection reported upon by Dr. Scott, in which the wrapped coatings are markedly superior in protective value to the simple unreinforced line treatments.

Perhaps the greatest draw-back of wrapped coatings of this class lies in the fact that proper application is extremely difficult, and under some circumstances practically impossible. Faulty application has been the cause of failure in the case of almost every wrapped coating of this type which has been examined by the writer. Application of the molten bitumen and of the wrapping fabric by machines, either in the mills or at centrally located coating points, has been widely resorted to in recent years. There can be no doubt that the wrapping machines eliminate by far the greater part of the difficulties which arise from faulty application. Offsetting this advantage, and resulting, after the pipe has been finally placed in the line, in a coating of no greater protective value than the average hand-wrapped field job, is the almost inevitable damage which is suffered by the coatings in shipping, loading, stringing, handling and laying the pipe. Much work is being done upon the development of machines for applying wrapped coatings to the pipe in the field after it has been laid. This seems to be a much better method for the use of wrapping machines than does any method involving handling of the pipe after coating.

A newer type of reinforced coating, and one which has demonstrated great promise in all tests which have been conducted, involves the use of reinforcing fabrics merely to protect an underlying enamel coating against soil stress effects. In coatings of this type no attempt is made to stick reinforcement to the pipe; it is wrapped loosely over the enamel and serves merely to distribute the soil load and to prevent adhesion of soil to the coating bitumen. Coatings of this class are described and illustrated in the papers by Scott and Fitzgerald which have been referred to above. It is not yet definitely known what type of reinforcement may be expected to give the best service for this class of work. Mr. Fitzgerald cites an instance illustrating a common soil stress condition, in which practically all of the soil stress action took place during the first three months of burial of a coating material and was probably due to settling of soil around the pipe. Where only this type of stress action is to be combated, impermanent reinforcing materials can be advantageously and economically employed. Under the less common, but most severe, stress conditions which arise in alternately wet and dry, highly colloidal soils, a permanent reinforcement will be required. At the present status of the investigation of such methods, it is not possible to state definitely the value of various reinforcing wrappings. The following classes and types of reinforcement are under investigation:

FIGURE 12
*Enamel coating under the veneer illustrated in Figure* 11. *The coating has been pressed into the enamel, deforming it, but there has been no penetration of the enamel coating*

A. Saturated felts were used in the tests described by Fitzgerald and Scott and have been employed in several treatments of long trunk lines. Such felts, particularly saturated asbestos felts, will probably afford quite permanent reinforcement.

B. Cloth fabrics of various types, although comparatively inexpensive, will probably be relatively ineffective, both because they disintegrate badly underground and because they are soft and will not satisfactorily distribute the forces which are exerted by the soil.

C. Paper wrappings of various sorts are less expensive than the felts, and will offer excellent protection against soil stress for a comparatively short time. Heavy wrapping paper and various grades of building paper have been used for this purpose.

D. Soft metallic coatings, of which aluminum foil is a representative, are being investigated. These have been described in a previous paper[5]:

They offer some promise, but are still in the experimental stage.

E. Heavier metallic sheaths, made up of black or galvanized sheet steel, will positively prevent stress of underlying coatings during their life.

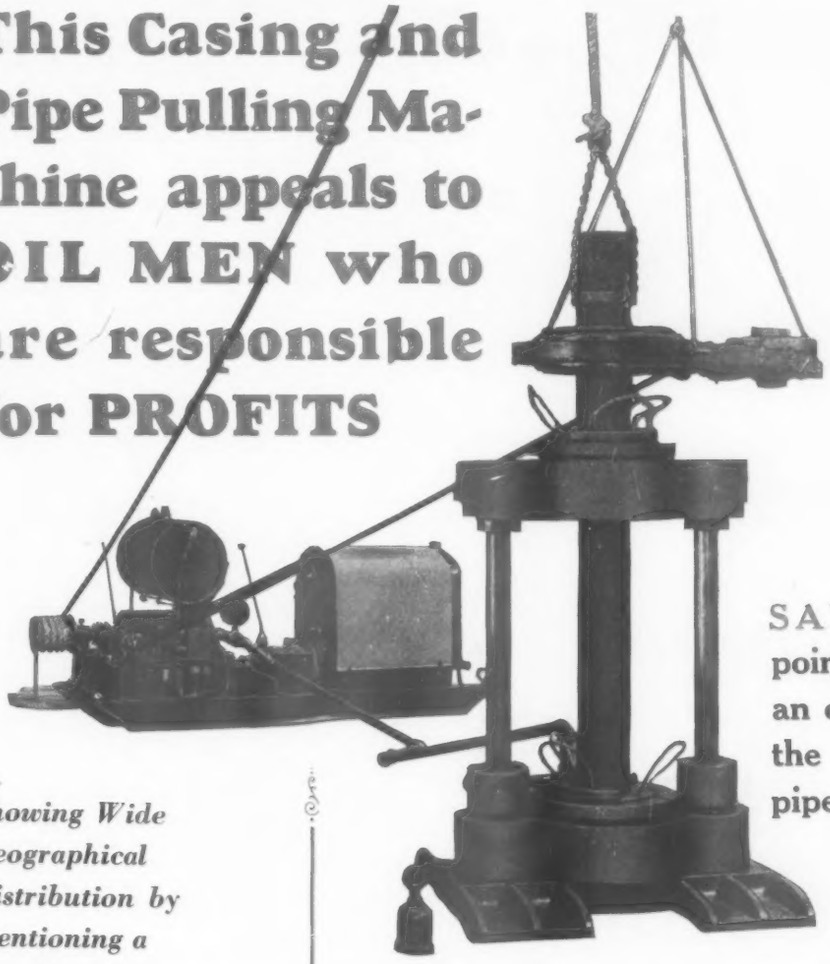
F. Wood veneer also serves as a rigid reinforcing material and has demonstrated an effectiveness, the importance of which is minimized by the difficulty and expense of applying such a wrapping material.

### Miscellaneous

A number of other methods of coating application have been resorted to combat particularly severe conditions. Extremely thick coatings of bituminous material have been built up by placing a wooden box or sheet-metal shell around the pipe and filling the space between it and the pipe with

[5]Gill, Rogers and McGary—The Oil Weekly—January 31, 1930.

# This Casing and Pipe Pulling Machine appeals to OIL MEN who are responsible for PROFITS



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The original investment is repaid from profits from operation of one of these machines over a thirty-day period. *Larger machines* in the 6 cylinder hydraulic pump with jacks in lengths of 5′—6′ and 7′ may be had.

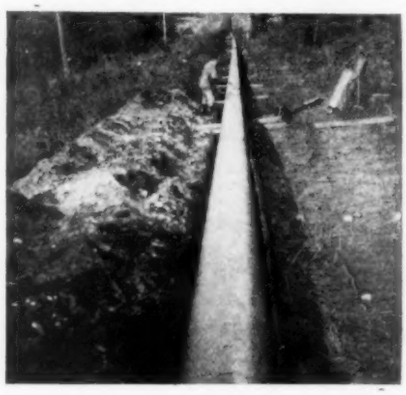
Los Angeles
March 16-23,
1930

Be sure and see a demonstration of this machine at Booth 106

*Write for the facts of the remarkable profits this machine is making for leading oil companies.*

## The THRIFT CORPORATION

HOUSTON, TEXAS



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**Our organization is adequately equipped to handle all details of Pipe Line Construction work. We do a complete job.**

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bitumen. Such methods find considerable application in combating stray-current electrolysis but otherwise are seldom justifiable. Coatings of Portland cement mortar, when properly applied, and reinforced are effective against the most severe attack of metal by simple soil corrosion action. They are, however, extremely expensive and are not proof against stray current electrolysis.

### Comparison of Coating Types

In the foregoing sketchy discussion, an attempt has been made to present some of the more salient features of our present knowledge of protective coatings. It may be readily seen that on many points this knowledge is incomplete, that many of the statements made may be subject to modification in the light of forthcoming developments and that any conclusions drawn may be superseded at any time. The realization of these facts causes any scientific statement of the merit of coating materials to be extremely indefinite. Despite his realization of the fact that the figures given cannot be exact and will probably be subject to alteration in the light of future experience, the writer ventures to submit, in his Table 2, estimates of the probable life extension possible through the use of coatings of various classes. The figures should, of course, be accepted with due caution and are submitted merely as an expression of opinions arrived at by the writer as a result of his experience. It is hoped that they may serve as a more or less useful guide or at least as a basis for helpful, if not too acrimonious, discussion.

### Summary

This paper is presented merely as a picture of the present status of pipe line protection practice. Developments in progress promise to result in a great improvement in protective methods. A few of the factors influencing a decision as to the choice of protective methods are outlined and the leading classes of protective coatings briefly discussed.

### Table II

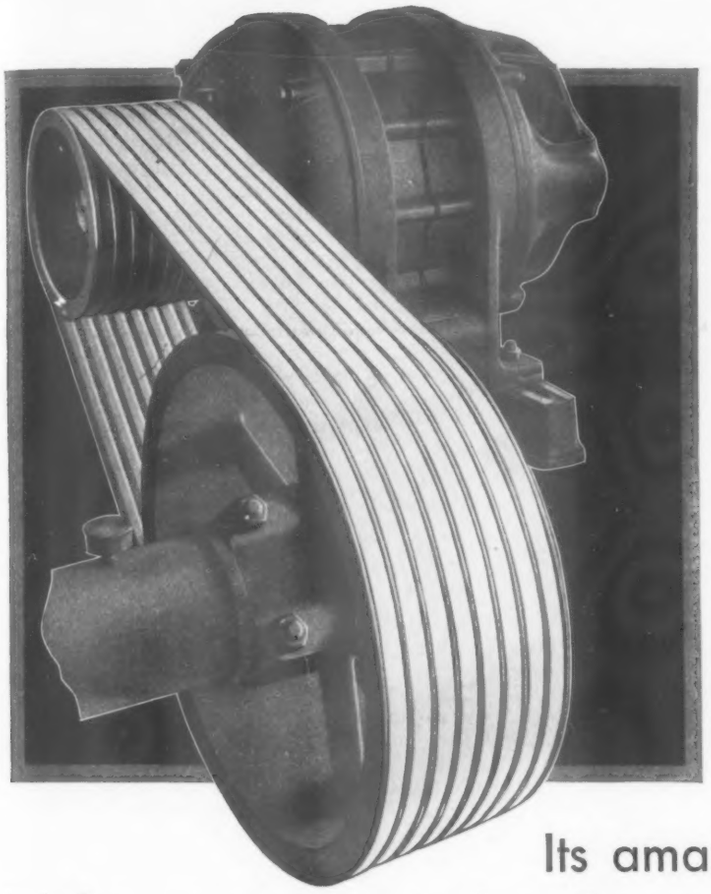
### Probable Years Increased Life of Pipe Obtained by Use of Protective Coatings

SPECIAL NOTE.—The writer requests that none of the figures contained in this table be quoted or used without a thorough perusal and understanding of the accompanying text.

| | Years Life of Bare Pipe | | |
|---|---|---|---|
| | Less than 5 years | 5-10 years | 10-20 years |
| Type of Coating— | | | |
| Cut-back bitumens | 0 | 0-1 | 1-5 |
| Greases, not reinforced[1] | 0[1] | 0[1] | 0-1[1] |
| Emulsions | 0 | 0 | 0-1 |
| Soft bitumens applied molten: | | | |
| Not reinforced | 0 | 0-1 | 1-5 |
| 1-ply wrapping[2] | 1-2[2] | 1-4[2] | 2-5[2] |
| 2-ply wrapping[2] | 2-4[2] | 2-5[2] | 3-7[2] |
| 3-ply wrapping[2] | 2-5[2] | 3-7[2] | 6-10[2] |
| Pipe-line enamels | | | |
| Not reinforced | ½-1 | 1-3 | 3-6 |
| Reinforced | 3-5 | 4-8 | 7-12 |

[1]Much better results than those indicated will be obtained from the greases under certain soil conditions.

[2]These figures assume average good practice in application of the coatings.



*Texrope Belts and Sheaves are carried in stock at points from which the entire country can be served promptly. Standard drives from 2 to 100 H. P. are thus available. Quick delivery can be made on larger drives.*

# Over 70,000 in service

## Its amazingly rapid acceptance is the most Convincing Recommendation for Texrope

**APPROXIMATELY four years ago Texrope Drive was announced to industry.**

**Today over 70,000 Texrope Drives are in service . . . giving more satisfactory performance than any other method of transmission . . . In every industry the trend is definitely toward Texrope.**

**In plants where flat belts last only a few weeks, Texropes are giving continuous service. Replacements are infrequent and inexpensive.**

**Where moisture or dirt is unavoidable, Texrope Drives operate with no loss in efficiency. Requiring no lubrication, the maintenance cost on Texropes is practically nothing . . and the drive is always clean, positive and silent.**

**From the fractional horsepower drives to heavy duty on crushers, mining machinery, oil line pumps and paper machinery, Texrope Drives are giving continuous service at amazingly low cost.**

## See How Texrope Solves Transmission Problems

**Texrope Drive consists of a driving and a driven sheave, grooved for V-shaped endless Texrope belts of rubberized cord fabric. Power is transmitted, with no slippage, by the wedging contact of the belts in the V-shaped grooves. The result is a short center drive with an efficiency of 98.9 per cent, requiring practically no maintenance and infrequent adjustment.**

**Continuous operation is assured. One or two belts may wear out after long service, but the remaining belts will carry the load until replacement is convenient. With Texrope it is possible to use a higher speed motor, with a consequent saving in cost . . . Texrope is rightly termed "The Perfect Transmission for Every Purpose". It will save money for you. Send for a copy of Bulletin 1228-K.**

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**ALLIS-CHALMERS**

# TEXROPE DRIVES

**THE PERFECT TRANSMISSION** — ALLIS-CHALMERS TEXROPE DRIVE — **FOR EVERY PURPOSE ··**

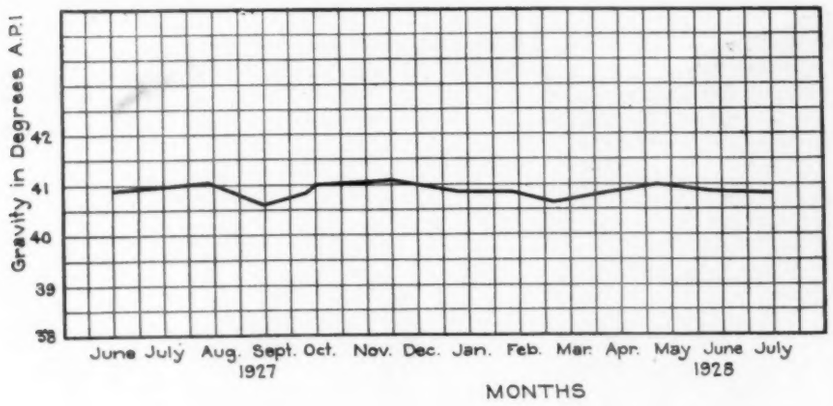



Figure 6- Gravity in degrees A.P.I. of crude oil in 80,000-barrel storage tank equipped with breather roof

(Continued from page 114)

vent the rupture of the tank roof after the roof has risen about six to eight inches above the top angle. Figure 7 shows a breather roof tank equipped with overflow line and overflow tank. The siphon break prevents the oil from siphoning from the storage tank to the overflow tank. In actual practice several breather tanks are connected to one overflow tank. For example: Assume that an 80,000-barrel tank was filled to one inch above the top angle, so that it will actually contain 80,155 barrels of oil; also assume that the tank was filled in the early spring with crude oil having a gravity of 40° A. P. I. and an average temperature of 60°F. During the summer months the average temperature of the oil body will increase to about 91°F. and cause the original volume of oil to expand to about 81,340 barrels an increase of about 1190 barrels. Since the overflow riser outlet is eight inches above the top angle, the roof will expand six inches before the oil begins the overflow. This six inches provides for an additional storage space of about 800 barrels, thus the actual amount of oil which flows into the overflow tank will be about 390 barrels. Under these conditions a 5000-barrel overflow tank can care for several 80,000-barrel tanks equipped with breather roofs. In fact, a smaller tank can be used and the overflow oil can be pumped to other storage. Among other factors controlling the amount of overflow is the amount of oil originally contained in the tank and the height of the overflow riser above the top angles. The overflow riser, however, should not exceed a maximum height of eight inches above the top angle. The writer inspected a tank farm containing thirty-five 80,000-barrel tanks equipped with breather roofs. All of the tanks were connected to one overflow tank having a capacity of 5000 barrels. Apparently the installation was giving satisfactory service.

During the winter months the oil in the tank contracts in volume because of the lowering of the temperature of the oil body. During this period it is necessary to pump the oil from the overflow tanks back into the storage tanks; otherwise the tank roof will act as a "gas breather" and will not be in constant contact with the oil surface.

Although this method of operation was originally designed for highly corrosive crudes, it is gaining favor among many operators because it provides additional storage space. For example, an 80,000-barrel tank filled to within eight inches of the top contains approximately 78,760 barrels, whereas if the tank were filled to the top it would contain approximately 80,000 barrels of oil, or an increase of storage of about 1240 barrels.

**Conclusions**

The first 80,000-barrel tank equipped with a breather roof was originally put into serviec in May, 1927. The tank has been in operation over two years and [illegible] months and is apparently giving good service.

The principal function of the breather-type roof is to reduce evaporation losses from crude petroleum in storage. To obtain the fullest benefit from this type of equipment, however, the tank should not be opened for gaging or inspection except during the cooler periods of the day when the roof is resting upon its rafters or upon the surface of the oil, unless it is equipped with a gage well. In addition, regular periodic inspections should be made of the vacuum and volume control valves.

Since this type of construction is vapor-tight and all-steel, the fire hazard is no greater than that of any all-steel vapor-tight tank. If the tank is filled to capacity and the roof is in contact with the surface of the liquid at all points, the fire hazard should be less, as there is no appreciable vapor space above the liquid surface.

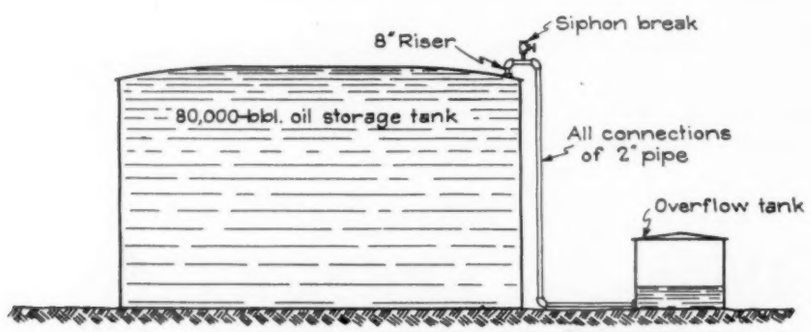



Figure 7- Breather tank equipped with overflow connections

## Oil Tank Ships Move Big Cargoes

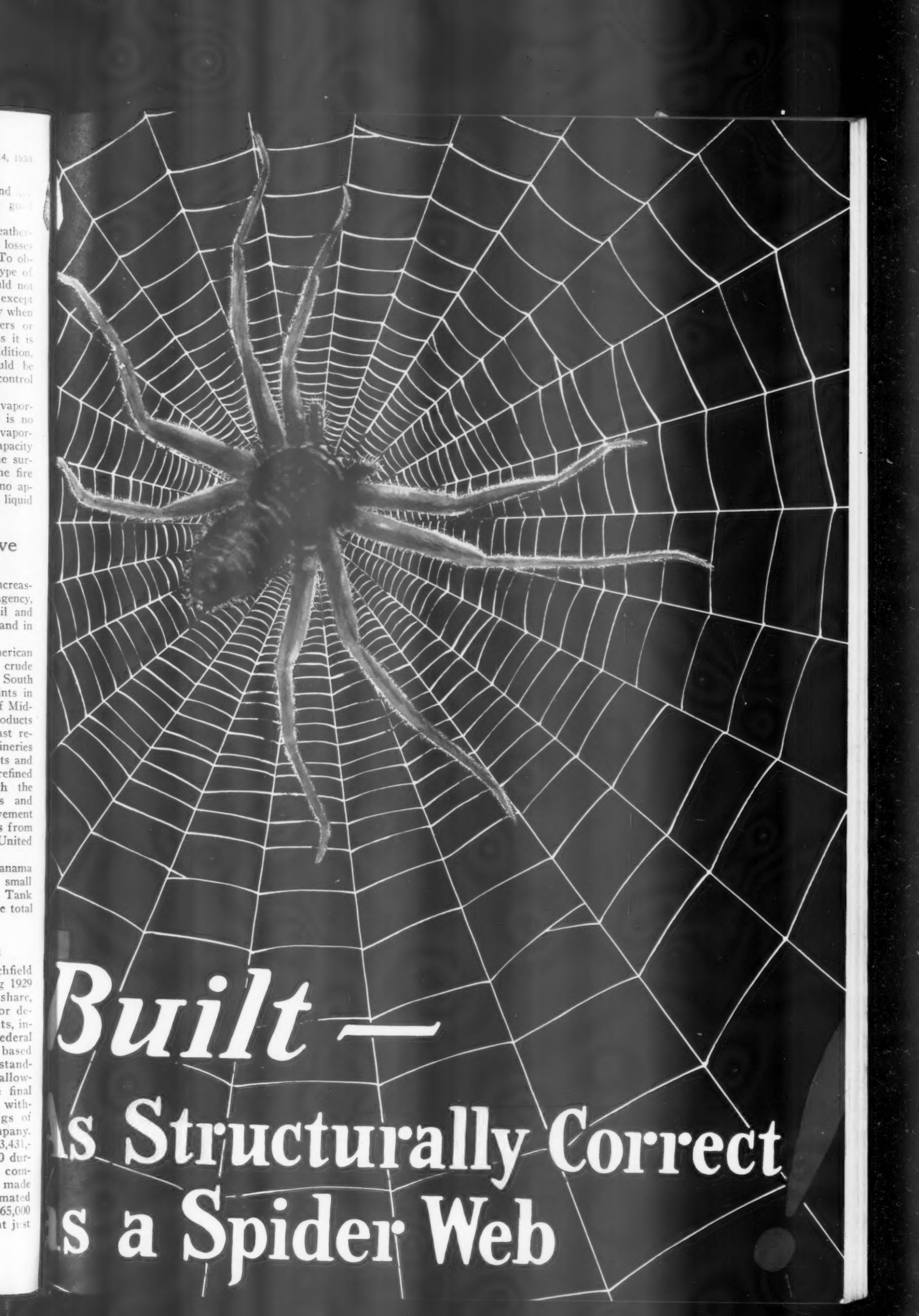
The tank vessel has become an increasingly important transportation agency, both for the carrying of crude oil and refined products, in domestic trade and in foreign trade.

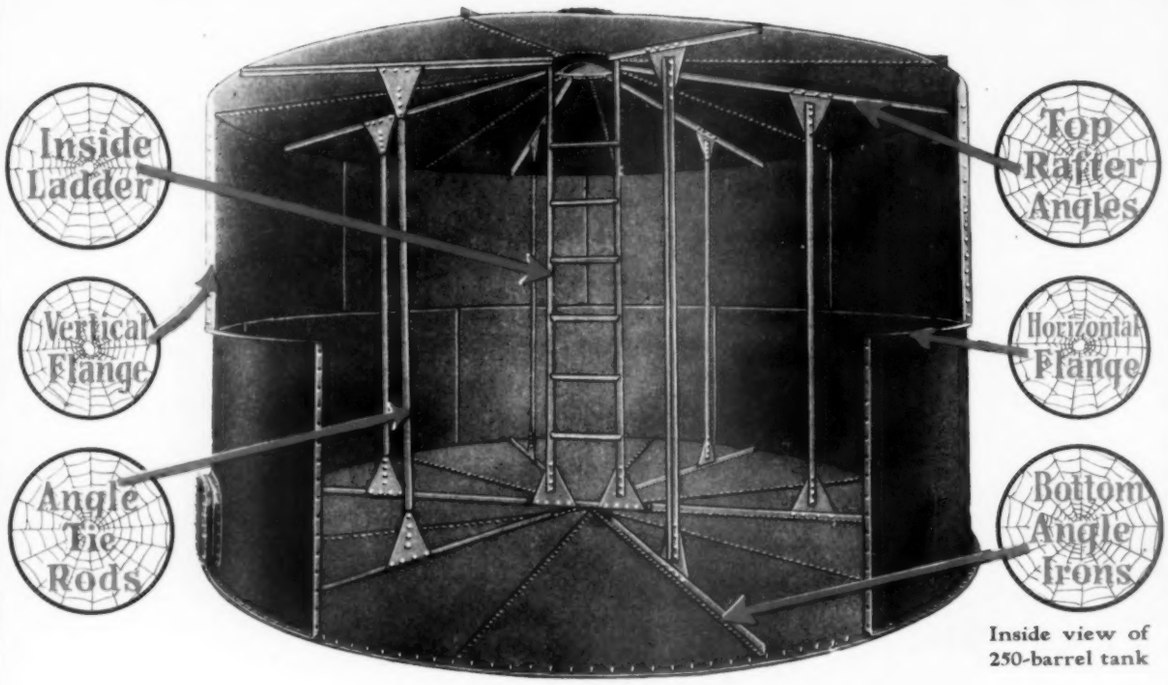
The principal movements of American tank vessels are in the carrying of crude oil from Mexico and northern South American countries to refinery points in the United States; in the carrying of Mid-Continent crude oil and refined products from Mid-Continent and Gulf Coast refineries to the Atlantic seaboard refineries and markets, and to foreign markets and in the carrying of crude oil and refined products from California through the Panama Canal to eastern points and abroad. There is an unceasing movement of tankers carrying refined products from coatsal refinery points in the United States to the markets of the world.

Petroleum traffic through the Panama Canal in recent years has had no small part in the Canal's financial success. Tank vessels pay about 20 per cent of the total tolls.

## Richfield Earnings

Los Angeles.—Earnings of Richfield Oil Company of California during 1929 totaled $8,554,494.29, or $4.40 per share, after providing $3.53 per share for depletion, depreciation, abandonments, intangible drilling expense and Federal income tax, this calculation being based on 1,947,241 shares of stock outstanding at the end of the year. After allowing for preferred dividends, the final net earnings was $4.04 per share, without including any of the earnings of Universal Consolidated Oil Company. Sales for the year increased to $83,431,000, as against sales of $52,021,000 during 1928. An appraisal of the company's under-ground reserves made during the summer of 1929 estimated total oil in the ground at 364,865,000 barrels, according to the statement just released.


Built —
As Structurally Correct
As a Spider Web




Inside view of 250-barrel tank

# Built on all Principles of STRENGTH

The B. S. & B. PERFECTION Vapor Pressure Tank has to be strong at every point to withstand the stringent load that is imposed upon it. They must be strong to have served so many so satisfactorily, and for so long.

Just as a spider's web is built on the same principles that a bridge is constructed, so are these tanks also structurally correct. Note the various points of strength: The staves that circle the tank horizontally acting like hoops; those that are vertical and so arranged alternately with others, likewise vertical; the flanges themselves; the angle iron tie rods, and the ladder itself which serves a similar purpose; the top rafter and bottom angle irons; the heavy gussets bolted to the angles; the pie-shaped segmental bottom and deck. Even the bolts themselves stand over 100,000 pounds tensile strength per square inch! Everything is made with strength in mind.

## B.S.&B. Perfection Vapor Pressure TANKS

With the aid of these tanks you can keep your oil in storage without appreciable evaporation loss, and at well-head gravity. They are more than gas tight—vapor pressure tight equipped with the B. S. & B. Thief Hole Pressure Vacuum Valve, which operates at 16 ounces pressure, or 2 ounces vacuum. This safety valve protects the tank, just as the tank protects your crude.

**"Service on the Dot!"**

From our branch to your lease in a few hours time. We are able to give service on delivery and installation of these tanks RIGHT THEN!

**"Service on the Spot!"**

With fifty Field Stations and stocks in each of them; with our own tank crews, we are able to give service in the field RIGHT THERE!

*Let us demonstrate the principles of strength on which these tanks are built, and further elaborate on their merits. May we send a plan or a man? Write Dept. X-3.*

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BARTLESVILLE - OKLAHOMA

Our Watchword S.E.R.V.I.C.E.

# Welded Tanks Becoming Popular in California

By BRAD MILLS
*Staff Representative*

IN addition to a definite trend in California toward the welding of tank roofs and bottoms on the larger sizes, there is also a growing preference for welded shell seams on small sizes, the latter practice having been successfully applied to tanks holding up to 6000 barrels. Welding of all seams on very small tanks has been practiced for many years, but the completion of intermediate sizes by this method is novel, at least in California fields.

Welding of both tops and bottoms has many advantages, although much predjudice has been manifested in the gradual change from the older method. Conversely, it is generally admitted that bolted roofs and bottoms have some advantages over the newer method. Regardless of this overlapping of ideas on the subject, welded seams are given the preference in a survey of most recent contracts.

When building bolted bottoms, it is necessary to assemble this layer about 30 inches above ground. This clearance allows space for workmen to tighten the bolts while working below the bottom. The process is somewhat expensive, necessitating careful lowering into position of the finished bottom.

Welded bottoms are complete in the correct position on the tank site and are ready for tests when the last seam is finished. Tests for leaks are made by forcing oil under the bottom. A sweating through will be observed where there is an imperfect weld. It usually requires less time from beginning to test on the welded bottom than on the bolted construction.

Welded roofs have the advantage of 100 per cent tightness and a greater permanency than bolted roofs.

One of the outstanding advantages of the welded roofs and bottoms is the elimination of shop fabrication in their construction. A natural result of this short cut from the steel mills is a large saving. When bolted bottoms and roofs are used, the sheet steel is shipped from the mills to the contractors shop, fabricated and sent to final location. This involves a double handling charge, in addition to actual cost of fabrication. One of the largest tank contractors in California informed the writer that it was now common practice to send the sheet steel directly from the mills to the point of construction.

Corrosion apparently gets a foothold easier down seams and around bolt-heads on bolted roofs and bottoms than on the more uniform welded types, according to tank builders who favor the latter.

When using sheet steel of uniform size in building welded tops and bottoms, the outside rims are of irregular shape. The necessary circle is made by cutting off the corners of the outside plates with a torch. Thus it is not necessary to fabricate even the outside plates to obtain the porper shape.

The problem of welding the shells of smaller tanks is not as great as might be suspected. One of the greatest obstacles has been to "sell' the idea. Many of these welded shells have been complete in California and they are giving uniform satisfaction. They have a tailored appearance not so noticeable in bolted shells, but this advantage has failed to win over opponents to the process.

The belief that welded shells in smaller tanks are easier maintained than the bolted type prevails among those favoring the former design, but the actual difference may prove to be negligible.

When tank shells are welded they cease to comply with A.P.I. specifications, this reason alone having been responsible for many objections from conservative operators. It was not until recently that the A.P.I. approved welded roofs and bottoms. The desire of both tank builders and operators to comply with these specifications has confined the practice to small tanks.

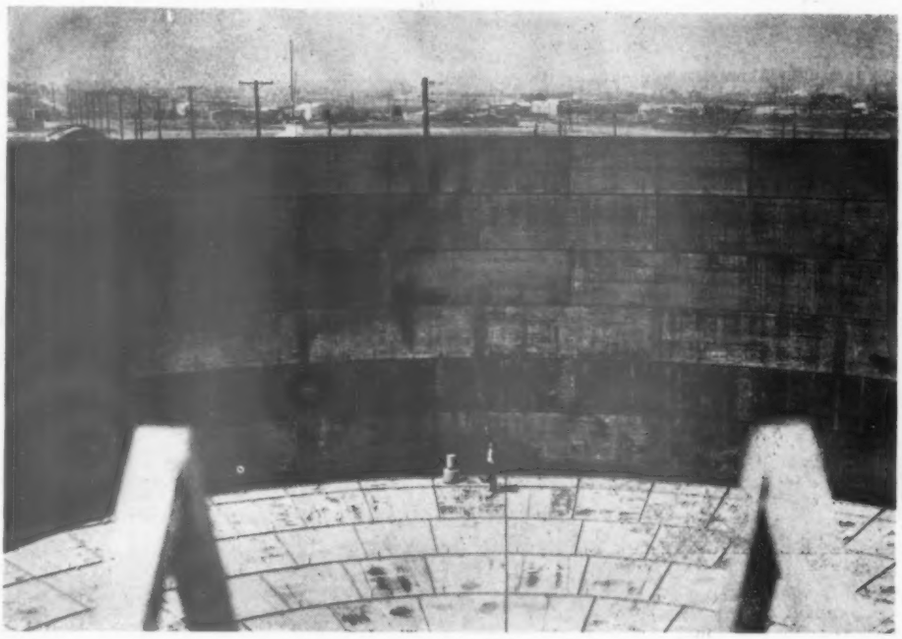
The largest tank contractors in California stated that they will weld the shells of any size tanks and guarantee them if an operator desires this type of construction. They have built many small welded tanks but have made no special effort to change the trend rapidly toward larger sizes.

One of the most common arguments against welded shells is the belief that tanks of this construction may not be moved. Welding enthusiasts answer this objection with the argument that few tanks are ever moved. It is also claimed that tanks with welded shells may be moved even with greater ease and speed than those of bolted construction by rigging them apart with torches.

Fewer leaks have developed in welded gasoline tanks of small size than in those with bolted shells, a builder of both types states, but this factor alone does not seem important enough to justify radical changes in design.

The cost of welding tops, bottoms and shells is considerably less than with the bolted types, due to speed of erection and absence of fabrication.

The welding of shells in the smaller sizes is still a small percentage of the total, but there is a possibility that the practice may reach much greater proportions.



*Building a large tank in California*

# Barrett Anti-Corrosion EVERY

*A river crossing in the Southern Natural Gas system—Protected with Barrett's pipe line specifications—Ford, Bacon and Davis, Inc., engineers. Hope Engineering Company, contractors.*

*Above is shown Barrett Pipe Enamel being applied by the "sling" method.*
*Picture taken during construction of a city main in the city of Atlanta, for the Atlanta Gas Light Company, Atlanta, Ga.*

## BARRETT Anti-Corrosion Specifications

**BARRETT Anti-Corrosion Specifications are made to meet all the many different conditions of pipe line construction. They include felt re-enforced enamels for extreme conditions—rivers, swamps, etc., enamels to be applied hot in less corrosive sections; cold applications for still less corrosive regions.**

# Specifications *for pipe line protection problem..*

THE corrosive conditions which affect pipe lines have been carefully studied by The Barrett Company's engineers and other experts in developing and perfecting Barrett Anti-Corrosion Specifications.

Chemical and physical characteristics of soils as determined by geologic and topographical or climatic conditions, depth of burial, drainage of trench, electrolysis—all these, and more, are taken into consideration. And the correct formula and methods of application are carefully worked out to combat each possible corrosive condition that may be met with in the field.

This is a part of the *Barrett Service and Inspection* that goes along with every pipe protection job. It is the outgrowth of *76 years' experience* in solving all manner of water-proofing and weather-proofing problems connected with nearly every kind of material. This is why Barrett Anti-Corrosion Specifications offer a service in this field just as Barrett Specification Roofs, Tarvia Roads, and Barrett Underground Water-proofings for tunnels, dams, subways, etc., have long done in theirs.

The water-proofing agents used with Barrett Anti-Corrosion Specifications are made from the finest coal-tar pitch. This well known water-proofing material is prepared and applied under the most exacting Barrett Anti-Corrosion Specifications. Non-porous, non-absorbent, chemically inert, these coatings give positive protection against virtually every corrosive element or combination of elements. They adhere in a strong, unbroken film, assuring added years of uninterrupted service.

The Barrett Company is organized to give pipe line builders the closest and fullest cooperation from beginning to end of the pipe laying job.

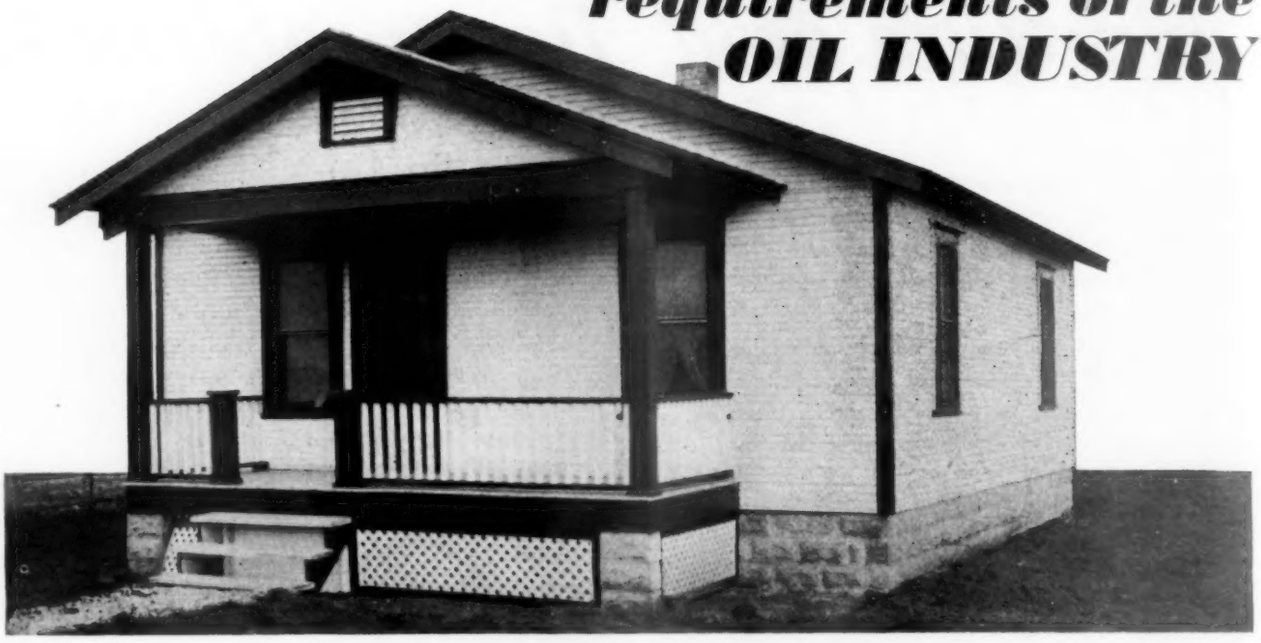
*For information on pipe line protection you are invited to phone, wire or write: The Barrett Company, New York*

*Section of Southern Natural Gas Company System in Alabama. Ford, Bacon & Davis, Inc., Engineers, Hope Engineering Company, Contractors.*

The Barrett Company

40 Rector St., New York

# "DURABILT" houses are Constructed to meet the exacting requirements of the OIL INDUSTRY



*Tidal Pipe Line Company, 4 room, 24 x 28*

**APPEARANCE:** "DURABILT" houses have the appearance of permanent construction; no unsightly battens inside or out.

**CONSTRUCTION:** All materials are selected. The only portable house on the market with FULL DIMENSION framing. Sidewall sections, rafters and joists are *bolted*, thus assuring strength and rigidity without the necessity of anchoring. "DURABILT" houses are insulated between the studding and siding with heavy weather proofing material that insures full protection against moisture, wind, insects, etc., and creates a dead air space between the walls that promotes greater comfort in all seasons.

**ERECTION:** Shop assembled in sections, convenient for shipping and handling. "DURABILT" houses are NOT the "readycut" type, but are fabricated for easy, speedy erection by any carpenter. If the customer prefers we can furnish "DURABILT" houses erected complete at a nominal additional cost.

In addition to standard two, three, four, five and six room plans, we also furnish bunk houses, garages and tourist houses. "DURABILT" houses can be constructed to conform to special plans.

"DURABILT" houses will appeal to those who want a better type of portable house construction. Write for full particulars, plans and specifications.

## OIL STATES MANUFACTURING CO.

BUILDERS OF "DURABILT" PORTABLE HOUSES

203 SOUTH DETROIT TULSA, OKLAHOMA

# Markets--Production--Crude Prices

H. J. STRUTH, *Staff Economist, Houston, Texas*

# California Crude Gets Increase; Production Takes Big Drop

PRODUCTION of crude oil in the United States took another sharp drop during the week ending March 8, bringing the total lower than has been reached since December, 1928. The drop for the week was 88,600 barrels, making the week's average 2,535,350 barrels. This drop is much more substantial than was the decline of the previous week, for while the previous drop was 98,000 barrels it followed a rise occasioned by proration tests of California fields. California was down 61,600 barrels as its contribution to the latest decline, showing evidence of the success of the plan for limiting output in that state. Oklahoma had a decline of 12,900 barrels, and Texas, outside of the Gulf Coast, was down 6100 barrels. Rocky Mountain States declined 8850 barrels, with other sections except Gulf Coast and Eastern States having small losses. Gulf Coast was up 1900 barrels and Eastern States 550 barrels.

Prospects for further decline are bright. California operators plan reducing production there another 50,000 barrels, and probably as important is announcement of a number of Mid-Continent operators that all possible activity will be stopped on Sunday. The idea of the Sunday shut-down, revived from last year when it was inaugurated with limited success, followed suggestion from the Federal Oil Conservation Board that refiners close their plants on Sunday. This suggestion was taken up first by Humble Oil & Refining Company with the announcement that its field and pipe line activities would be stopped as much as practical on Sunday, and was followed by Carter Oil Company and Oklahoma Pipe Line Company, other subsidiaries of Standard Oil Company of New Jersey, and Prairie Oil & Gas Company and Producers & Refiners Corporation in Oklahoma. How much credit the companies closing down on Sunday will claim on their proration allowances in prorated fields has not been indicated, but the presumption is left that this will be in addition to full participation in cooperative field curtailment.

### Refiners Limiting Runs

A questionnaire has received replies from refining companies representing approximately 80 per cent of the rated capacity of the United States, and generally it is revealed that these companies, including the largest, will comply with the Oil Conservation Board's suggestion of reducing gasoline output by curtailing runs to stills at least one-seventh of charging capacity in February. Many plants, the statements show, already were holding output to current demands and not adding to gasoline storage.

An interesting development of the comment brought forth by the board's request for curtailment of gasoline production is the statement from several of the most substantial refining and marketing concerns that their current stocks of motor fuel are not larger, and sometimes below, quantities on hand at this time a year ago. The companies so situated are all in accord in stating that they are not now adding to storage.

In this connection comment by the American Petroleum Institute on the weekly refinery statistics report on page 216 is of interest:

"In response to the American Petroleum Institute's request for refinery figures for the week ending March 1, 1930, companies aggregating 3,487,400 barrels, or 95.5 per cent of the 3,650,900 barrel estimated daily potential refining capacity of the plants operating in the United States during the week, have contributed to the following report. The crude runs to stills for the week show that these companies operated to 74.6 per cent of their total capacity.

"Figures published last week show that companies aggregating 3,484,400 barrels, or 95.4 per cent of the 3,650,000 barrel estimated daily potential refining capacity of all plants operating in the United States during that week, but which operated to only 72.2 per cent of their total capacity, contributed to that report.

"All crude runs to stills and stocks figures follow exactly the present Bureau of Mines definitions. In California, stocks of heavy crude and all grades of fuel oil are included under the heading 'Gas and Fuel Oil Stocks.' Crude oil runs to stills include both foreign and domestic crude.

"For the sake of comparison, total figures for the United States for the previous week are also shown."

### California

Curtailment is being favorably felt in California, production having dropped sharply in some of the largest fields. The settled fields are slower getting into motion but their total reduction has played a large part in the success of the statewide

### CALIFORNIA CRUDE PRICES ADVANCED

**CALIFORNIA crude oil has been advanced an average of 20 cents per barrel. The increase effects all refinable oil in oil fields of the state.**

**Announcement of the increase was made Wednesday, March 12, by Standard Oil Company of California, and was made effective Tuesday, March 11.**

**The following schedule of prices at Long Beach and Santa Fe Springs shows typical changes in postings of the several gravities:**

| | Long Beach | | Santa Fe Springs | |
|---|---|---|---|---|
| Gravity | New | Old | New | Old |
| 18-18.9 | $ .76 | $ .75 | $ | $ |
| 19-19.9 | .82 | .80 | | |
| 20-20.9 | .88 | .85 | | |
| 21-21.9 | .94 | .89 | .92 | .89 |
| 22-22.9 | 1.00 | .93 | .95 | .92 |
| 23-23.9 | 1.07 | .97 | 1.01 | .95 |
| 24-24.9 | 1.14 | 1.01 | 1.07 | .98 |
| 25-25.9 | 1.21 | 1.05 | 1.13 | 1.01 |
| 26-26.9 | 1.28 | 1.09 | 1.19 | 1.04 |
| 27-27.9 | 1.35 | 1.13 | 1.25 | 1.07 |
| 28-28.9 | 1.42 | 1.17 | 1.31 | 1.10 |
| 29-29.9 | 1.46 | 1.21 | 1.37 | 1.15 |
| 30-30.9 | 1.50 | 1.25 | 1.43 | 1.20 |
| 31-31.9 | 1.55 | 1.30 | 1.49 | 1.25 |
| 32-32.9 | 1.60 | 1.35 | 1.54 | 1.30 |
| 33-33.9 | | | 1.60 | 1.35 |
| 34-34.9 | | | 1.65 | 1.40 |
| 35-35.9 | | | 1.70 | 1.45 |
| 36-36.9 | | | 1.75 | 1.50 |
| 37-37.9 | | | 1.80 | 1.55 |
| 38-38.9 | | | 1.85 | 1.60 |
| 39-39.9 | | | 1.90 | 1.65 |

## CRUDE RUNS TO STILLS, GASOLINE AND GAS AND FUEL OIL STOCKS, WEEK ENDING MARCH 1, 1930

(Figures in barrels of 42 gallons)

| District— | Potential Daily Capacity | Potential Capacity Reporting Total | Potential Capacity Reporting Per Cent | Crude Runs to Stills Total | Crude Runs to Stills Daily Average | Crude Runs to Stills Per Cent Operated | Gasoline Stocks | Gas & Fuel Oil Stocks |
|---|---|---|---|---|---|---|---|---|
| East Coast | 605,700 | 605,700 | 100.0 | 3,412,500 | 487,500 | 80.5 | 8,433,000 | 6,391,000 |
| Appalachian | 128,100 | 116,600 | 91.0 | 580,500 | 82,900 | 71.1 | 1,679,000 | 677,000 |
| Indiana, Illinois, Kentucky | 360,000 | 355,000 | 98.6 | 2,127,500 | 303,900 | 85.6 | 7,804,000 | 3,000,000 |
| Oklahoma, Kansas, Missouri | 462,200 | 411,700 | 89.1 | 1,898,400 | 271,200 | 65.9 | 4,698,000 | 3,222,000 |
| Texas | 778,000 | 705,700 | 90.7 | 4,232,600 | 604,700 | 85.7 | 8,097,000 | 12,005,000 |
| Louisiana-Arkansas | 270,600 | 262,000 | 96.8 | 1,300,400 | 185,800 | 70.9 | 2,686,000 | 2,092,000 |
| Rocky Mountain | 148,900 | 139,300 | 93.6 | 387,100 | 55,300 | 39.7 | 2,925,000 | 1,042,000 |
| California | 897,400 | 891,400 | 99.3 | 4,261,500 | 608,800 | 68.3 | 15,868,000 | 109,781,000 |
| Total Week March 1 | 3,650,900 | 3,487,400 | 95.5 | 18,200,500 | 2,600,100 | 74.6 | 52,190,000 | 138,211,000 |
| Total Week *February 22 | 3,650,900 | 3,484,400 | 95.4 | 17,612,700 | 2,516,100 | 72.2 | 51,734,000 | 138,134,000 |
| **The Texas and Louisiana Gulf Coastal Figures Shown Below are Included Above in the Totals of Their Respective Districts:** | | | | | | | | |
| Texas Gulf Coast | 526,500 | 526,500 | 100.0 | 3,265,700 | 466,500 | 88.6 | 6,919,000 | 9,365,000 |
| Louisiana Gulf Coast | 147,500 | 147,500 | 100.0 | 817,800 | 116,800 | 79.2 | 2,353,000 | 1,261,000 |

*Revised due to receipt of additional California reports and because of error in last weeks report which carried the Gas & Fuel Oil stocks in Louisiana-Arkansas district as 1,401,000 barrels, and which figure was used in arriving at last weeks Gas and Fuel stocks total, when the figure should have read 2,204,000 barrels. Louisiana Gulf Coast not affected by change.

program and a much greater drop is expected from this group within the next two weeks. The state total is approaching 650,000 barrels, with a further reduction of about 60,000 barrels being necessary to reach the desired level.

Curtailment, plus the natural decline at Santa Fe Springs has rapidly brought production down to 150,000 barrels. The output here will be held to this figure with little trouble. The Clarke zone would stage a nosedive if opened up and it is believed that the field total would reach 150,000 barrels daily within 60 days if the various zones were given a better chance to produce.

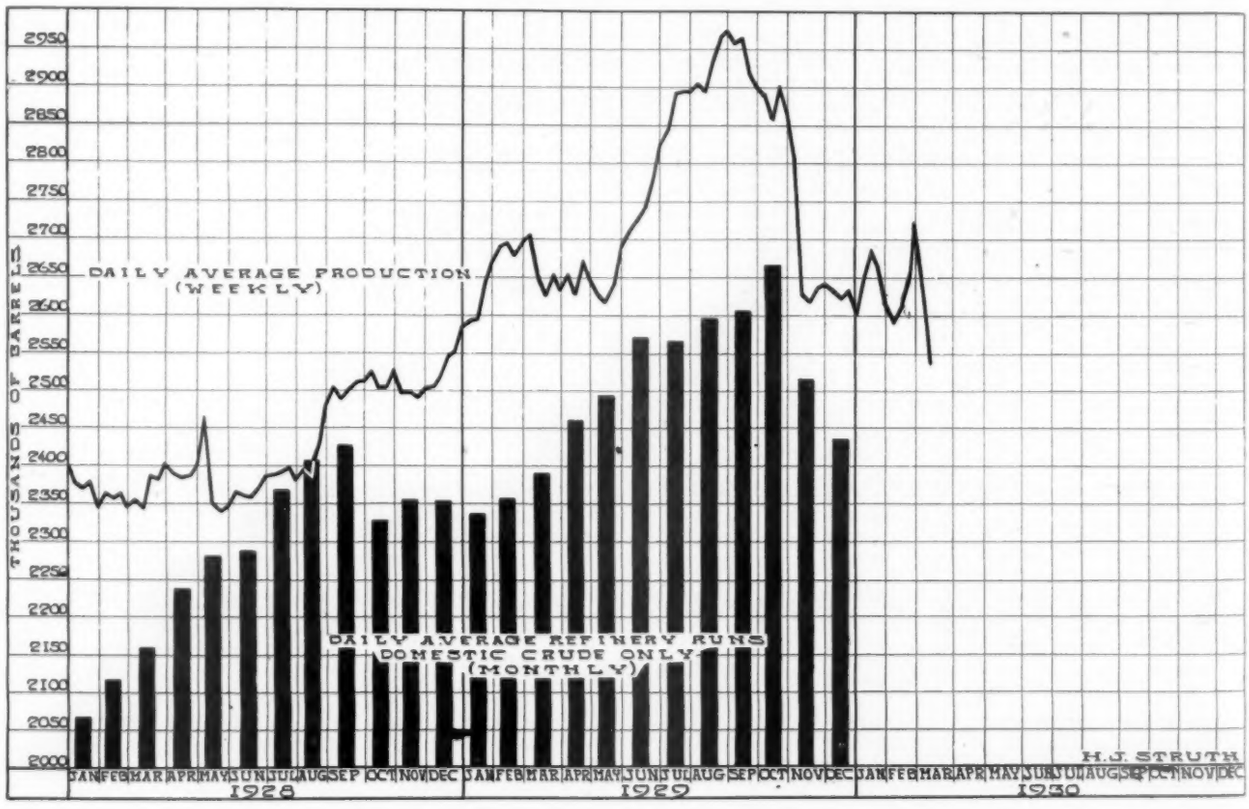
Long Beach has had less difficulty in getting under the 100,000-barrel mark than anticipated, with production showing as low as 90,000 barrels. This field has more than 200 operators and such a rapid reduction is considered remarkable.

The Lost Hills field has been entirely shut in, with several San Joaquin Valley fields showing sharp reductions. Reducing the output in these heavy fields has had a beneficial effect on the crude market.

Attempts to reduce refinery runs have been successful, Standard Oil Company of California having announced that it would operate its refineries on the equivalent of a six-day week. Other larger refiners will reduce runs at once. This practice will do more to strengthen the gasoline market than any other step that could be made. Gasoline stocks are far too high in California, but developments indicate an early reduction.

The gasoline market has been dull, with cargoes moving at six cents and out-of-state shipments bringing from 6¼ to 6¾ cents. The demand has been fair but excess production has weakened both the wholesale and retail markets.

## DOMESTIC PRODUCTION AND REFINERY RUNS



## FIELD STATISTICS OF IMPORTANT DISTRICTS

| Pool— | Oil Wells Completed | Total Initial Production | Initial Per Well | Number Producing Wells | Daily Production Barrels | Daily Prod. Per Well | Rigs Up | Wells Drilling |
|---|---|---|---|---|---|---|---|---|
| **WEST TEXAS:** | | | | | | | | |
| Hendrick | 621 | 3,117.155 | 5,028 | 564 | 92,010 | 162[2] | .. | 2 |
| Church & Fields | 215 | 215,370 | 1,002 | 207 | 22,360 | 108 | .. | 4 |
| Gulf-McElroy | 85 | 62,055 | 730 | 83 | 14,220 | 171 | .. | 2 |
| Yates | 371 | 2,507,415 | 6,758 | 359 | 133,835 | 376[2] | 3 | 14 |
| **TEXAS PANHANDLE:** | | | | | | | | |
| Gray County | 556 | 400,530 | 720 | 530 | 53,425 | 101[2] | 15 | 50 |
| **CALIFORNIA:** | | | | | | | | |
| Santa Fe Springs[1] | 539 | 1,612,150 | 2,994 | 266 | 155,000 | 582 | 10 | 115 |

[1]Includes deep production only. For field total add 80 wells and 7,000 barrels.
[2]Production partially pinched.

There is grave danger of another gasoline war in California. Stations leased by major companies to individuals are selling gasoline at three cents under the posted retail price in many localities in and around Los Angeles. This is the first time that stations owned by the major companies have sold gasoline at less than the posted prices since the end of the price war more than a year ago.

There is a little better feeling in the crude market, with long-time contracts being made at from the posted price to a premium of a few cents.

Fuel oil has shown little improvement but a reduction in production of both crude and refinery runs will help this commodity.

## Texas Co. Abandons Panhandle Proration

Wichita Falls, Texas.—The Texas Company resumed paying in full for all oil accepted from outside leases in North Texas and the Panhandle March 6, and waived the accumulated storage charges on oil that had been handled on a part payment plan. This company failed to gain the support of other purchasers in the two districts when it initiated the storage plan on February 17, 1930. The policy of paying for only 50 per cent of the oil run, with the remainder going to storage at three cents per barrel per month was placed into effect in Wilbarger County by the Humble Oil & Refining Company, Sinclair Oil & Gas Company, and Waggoner Refining Company on January 1, but The Texas Company did not fall in line in this particular county until the general order was issued in February. The Texas Company is now being bombarded with requests to make connections in Wilbarger County by producers seeking to break loose from the above trio of purchasers.

Sinclair Crude Oil Purchasing Company applied greater restrictions on its crude buying policy in Wilbarger County March 8 by notifying all connections that crude acceptances would be reduced 50 per cent, and that the practice of storing oil would be discontinued. This plan forces the producers to hold back production, erect storage or arrange for other market outlets. No announcement has been made by the company as to whether the crude accepted for storage since the first of the year would be bought in at current posted prices, or whether accumulated storage charges against the oil would be waived as was the case with The Texas Company.

The official order issued by The Texas Company on March 5 regarding cancellation of the storage plan follows: "Effective 7 a.m. March 6 The Texas Company will discontinue receiving oil for storage. Notice dated February 15, 1930, relating to storage of 50 per cent in certain fields is hereby cancelled. Until further notice, The Texas Company will purchase on its usual terms that part of current production which has been heretofore run for storage. Oil owners now have option of selling to this company at today's posted price oil stored under notice of February 15, 1930, and this company will absorb storage charges."

Since producers that were affected by the part payment plan will not be billed for storage by The Texas Company, the former will be none the worse off financially, except for delay in being paid for oil, as most of them will sell the storage oil at the current market price. The part payment plan is very unpopular with the smaller producing units, and heretofore it has been the policy of the storage company to waive accumulated storage fees, as was the case in the summer of 1924 when various purchasers inaugurated proration plan.

### IMPORTS OF PETROLEUM AT PRINCIPAL UNITED STATES PORTS
(Barrels of 42 Gallons)

| | Week Ended March 1 | Week Ended Feb. 22 |
|---|---|---|
| AT ATLANTIC COAST PORTS— | | |
| Baltimore | 69,000 | 263,000 |
| Boston | 69,000 | 123,000 |
| New York | 1,179,000 | 1,121,000 |
| Philadelphia | 250,000 | 358,000 |
| Others | 378,000 | 290,000 |
| Total | 1,945,000 | 2,155,000 |
| Daily Average | 277,857 | 307,857 |
| AT GULF COAST PORTS— | | |
| Galveston District | ..... | 64,000 |
| New Orleans and Baton Rouge | 15,000 | * 145,000 |
| Port Arthur and Sabine District | 26,000 | ..... |
| Tampa | 15,000 | ..... |
| Total | 56,000 | 209,000 |
| Daily Average | 8,000 | 29,857 |
| AT ALL UNITED STATES PORTS— | | |
| Total | 2,001,000 | 2,364,000 |
| Daily Average | 285,857 | 337,714 |
| Daily Average Four Weeks Ended | 278,750 | 258,929 |

### CALIFORNIA OIL RECEIPTS AT ATLANTIC AND GULF COAST PORTS
(Barrels of 42 Gallons)

| | Week Ended March 1 | Week Ended Feb. 22 |
|---|---|---|
| AT ATLANTIC COAST PORTS— | | |
| Baltimore | ..... | ..... |
| Boston | ..... | ..... |
| New York | 145,000 | 95,000 |
| Philadelphia | ..... | 117,000 |
| Others | ..... | ..... |
| Total | 145,000 | 212,000 |
| Daily Average | 20,714 | 30,286 |
| AT GULF COAST PORTS— | | |
| Total | 30,000 | ..... |
| Daily Average | 4,286 | ..... |
| AT ATLANTIC AND GULF COAST PORTS— | | |
| Total | 175,000 | 212,000 |
| Daily Average | 25,000 | 30,286 |
| Daily Average Four Weeks Ended | 52,786 | 61,464 |
| **Distribution of Total California Oil Receipts is as Follows:** | | |
| Gasoline | 105,000 | 117,000 |
| Gas Oil | 70,000 | ..... |
| Fuel Oil | ..... | 95,000 |
| Total | 175,000 | 212,000 |

*Revised.

# Marketing methods have changed, too! *Sell*

# SINCLAIR THREE-GAS SERVICE

**There are today so many different types of engines —and so many different driving conditions in traffic and in the open—that one kind of gasoline today cannot be *exactly right* for *all* cars, and for *all* needs. It takes *three* different gasolines to meet all motoring demands, and wise motorists will buy their gas where they can *choose* from these three and get superior engine performance—give your trade these three and build increased gallonage.**

**Here's *Sinclair Aircraft Gasoline*, the *Ace* of high test gasolines, for the motorist who wants quick getaway, flashy acceleration and brilliant road performance. Sinclair Aircraft is the Ace of high test gasolines because it is specially manufactured at Sinclair Refineries, meeting the requirements of the Federal Specifications Board for Aviation Gasoline—domestic grade—and gives sustained power. Due to its careful fractionation it is free from dissolved gases which cause gas locks, uneven distribution, galloping and engine balk.**

**Here's *Sinclair H-C Gasoline* for those who want high compression performance—*who want to stop knocks and keep them stopped*—all gasoline, nothing added!**

**And here's *Sinclair Regular Gasoline* for those who prefer to pay three cents less per gallon and yet get gas that is full of eager power. The quality gasoline at a popular price! Sell Sinclair Three-Gas Service—get the jump on competition and earn a jump in gallonage.**

**SINCLAIR REFINING COMPANY, INC., 45 Nassau Street, New York—*Atlanta, Chicago, Houston, Kansas City***

# CRUDE OIL PRICE QUOTATIONS

*(Revised to March 11, 1930)*

### EASTERN STATES

(Effective November 12, 1929)

| | |
|---|---|
| Penna Grade Oil in New York Transit Lines (New York) | $3.05 |
| Bradford District Oil in National Transit Lines (Pennsylvania) | 3.05 |
| Penn Grade Oil in National Transit Lines (Pennsylvania) | 3.05 |
| Penn Grade Oil in Southwest Pennsylvania Lines (Penna.) | 3.00 |
| Penn Grade Oil in Eureka Pipe Line Lines (West Virginia) | 2.90 |
| Penna Grade Oil in Buckeye Pipe Line Lines (Ohio) | 2.70 |
| Cabell Grade Oil in Eureka Pipe Line Lines (West Virginia) | 1.75 |
| Corning 35-cent Grade Oil in Buckeye Pipe Line Co.'s lines | 1.80 |
| Corning 25-cent Grade Oil in Buckeye Pipe Line Co.'s lines | 1.90 |
| Somerset Oil in Cumberland Pipe Line lines (Kentucky) | 1.55 |
| Ragland Grade Oil in Cumberland Pipe Line lines (Kentucky) (Effective Jan. 29, 1929) | 60 |
| Keister (Pennsylvania) | 1.20 |

### CENTRAL STATES

(Effective February 15, 1930)

Posted by Ohio Oil Co.

| | |
|---|---|
| Illinois | $1.60 |
| Indiana | 1.42 |
| Lima | 1.65 |
| Plymouth | 1.18 |
| Princeton | 1.60 |
| Wooster | 1.75 |

### WESTERN KENTUCKY

| | |
|---|---|
| All grades | $1.50 |

### OKLAHOMA-KANSAS

(Effective February 15, 1930)*

| | |
|---|---|
| Below 25 gravity | $ .60 |
| 25 to 25.9 gravity | .66 |
| 26 to 26.9 gravity | .72 |
| 27 to 27.9 gravity | .78 |
| 28 to 28.9 gravity | .84 |
| 29 to 29.9 gravity | .90 |
| 30 to 30.9 gravity | .96 |
| 31 to 31.9 gravity | 1.02 |
| 32 to 32.9 gravity | 1.08 |
| 33 to 33.9 gravity | 1.11 |
| 34 to 34.9 gravity | 1.14 |
| 35 to 35.9 gravity | 1.17 |
| 36 to 36.9 gravity | 1.20 |
| 37 to 37.9 gravity | 1.23 |
| 38 to 38.9 gravity | 1.26 |
| 39 to 39.9 gravity | 1.29 |
| 40 to 40.9 gravity | 1.32 |
| 41 to 41.9 gravity | 1.35 |
| 42 to 42.9 gravity | 1.38 |
| 43 to 43.9 gravity | 1.41 |
| 44 and above | 1.44 |

*This schedule was adopted initially by Carter Oil Company on January 15, and became general when Prairie Oil & Gas Company adopted it on February 15.

### PANHANDLE

(Effective Jan. 15, 1930)

#### GRAY COUNTY

| | |
|---|---|
| Below 29 gravity | $ .69 |
| 29 to 29.9 gravity | .75 |
| 30 to 30.9 gravity | .81 |
| 31 to 31.9 gravity | .87 |
| 32 to 32.9 gravity | .93 |
| 33 to 33.9 gravity | .96 |
| 34 to 34.9 gravity | .99 |
| 35 to 35.9 gravity | 1.02 |
| 36 to 36.9 gravity | 1.05 |
| 37 to 37.9 gravity | 1.08 |
| 38 to 38.9 gravity | 1.11 |
| 39 to 39.9 gravity | 1.14 |
| 40 to 40.9 gravity | 1.17 |
| 41 to 41.9 gravity | 1.20 |
| 42 to 42.9 gravity | 1.23 |
| 43 to 43.9 gravity | 1.26 |
| 44 and above | 1.29 |

#### WHEELER COUNTY

| | |
|---|---|
| Below 30 gravity | $ .70 |
| 30 to 30.9 gravity | .76 |
| 31 to 31.9 gravity | .82 |
| 32 to 32.9 gravity | .88 |
| 33 to 33.9 gravity | .91 |
| 34 to 34.9 gravity | .94 |
| 35 to 35.9 gravity | .97 |
| 36 to 36.9 gravity | 1.00 |
| 37 to 37.9 gravity | 1.03 |
| 38 to 38.9 gravity | 1.06 |
| 39 to 39.9 gravity | 1.09 |
| 40 to 40.9 gravity | 1.12 |
| 41 to 41.9 gravity | 1.15 |
| 42 to 42.9 gravity | 1.18 |
| 43 to 43.9 gravity | 1.21 |
| 44 and above | 1.24 |

#### CARSON-HUTCHINSON COUNTIES

| | |
|---|---|
| Below 32 gravity | $ .72 |
| 32 to 32.9 gravity | .78 |
| 33 to 33.9 gravity | .81 |
| 34 to 34.9 gravity | .84 |
| 35 to 35.9 gravity | .87 |
| 36 to 36.9 gravity | .90 |
| 37 to 37.9 gravity | .93 |
| 38 to 38.9 gravity | .96 |
| 39 to 39.9 gravity | .99 |
| 40 to 40.9 gravity | 1.02 |
| 41 to 41.9 gravity | 1.05 |
| 42 to 42.9 gravity | 1.08 |
| 43 to 43.9 gravity | 1.11 |
| 44 and above | 1.14 |

#### SOMERSET

| | |
|---|---|
| Below 33 gravity | $1.05 |
| 33 to 33.9 gravity | 1.07 |
| 34 to 34.9 gravity | 1.09 |
| 35 to 35.9 gravity | 1.11 |
| 36 to 36.9 gravity | 1.13 |
| 37 to 37.9 gravity | 1.15 |
| 38 and above | 1.17 |

## CALIFORNIA CRUDE OIL PRICES AT THE WELL

(EFFECTIVE NOVEMBER 8, 1929)

**Following are the current prices offered by Standard Oil Company for crude oil at the well: (Price per barrel of 42 gallons in fields indicated)**

| Gravity | Ventura* | Signal Hill | Alamitos Heights-Seal Beach | Huntington Beach | Inglewood | Olinda-Brea Canon | Athens-Rosecrans Dominguez | Elwood† Terrace | Torrance | Richfield | Whittier La Habra | Montebello | Coyote Hills | Santa Fe Springs | Newhall McKittrick Kern River | Midway-Sunset Elks Hills | Buena Vista Hills | Lost Hills | Coalinga | Wheeler Ridge |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 14-14.9 | $ .85 | $ .70 | $ .70 | $ .70 | $ .70 | $ .70 | $ .. | $ .. | $ .70 | $ .70 | $ .70 | $ .70 | $ .70 | $ .. | $ .50 | $ .50 | $ .50 | $ .50 | $ .50 | $ .50 |
| 15-15.9 | .85 | .70 | .70 | .70 | .70 | .70 | .. | .. | .70 | .70 | .70 | .70 | .70 | .. | .50 | .50 | .50 | .50 | .50 | .50 |
| 16-16.9 | .85 | .70 | .70 | .70 | .70 | .70 | .. | .. | .70 | .70 | .70 | .70 | .70 | .. | .50 | .50 | .50 | .50 | .50 | .50 |
| 17-17.9 | .85 | .70 | .70 | .70 | .70 | .70 | .. | .. | .70 | .70 | .70 | .70 | .70 | .. | .50 | .50 | .50 | .50 | .50 | .50 |
| 18-18.9 | .85 | .75 | .75 | .75 | .75 | .75 | .. | .. | .75 | .75 | .75 | .70 | .75 | .. | .50 | .56 | .56 | .56 | .56 | .56 |
| 19-19.9 | .85 | .80 | .80 | .80 | .80 | .80 | .. | .. | .80 | .80 | .80 | .75 | .80 | .. | .50 | .62 | .62 | .62 | .62 | .62 |
| 20-20.9 | .85 | .85 | .85 | .85 | .85 | .85 | .. | .. | .85 | .85 | .84 | .80 | .84 | .. | .. | .68 | .68 | .68 | .68 | .68 |
| 21-21.9 | .86 | .89 | .89 | .89 | .89 | .89 | .. | .. | .89 | .89 | .88 | .85 | .88 | .89 | .. | .74 | .74 | .74 | .74 | .74 |
| 22-22.9 | .87 | .93 | .93 | .93 | .93 | .93 | .. | .. | .93 | .93 | .91 | .90 | .91 | .92 | .. | .80 | .80 | .80 | .80 | .80 |
| 23-23.9 | .90 | .97 | .97 | .97 | .97 | .97 | .. | .. | .97 | .97 | .. | .95 | .94 | .95 | .. | .85 | .85 | .85 | .85 | .85 |
| 24-24.9 | .94 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | 1.01 | .. | 1.01 | 1.01 | .. | .98 | .97 | .98 | .. | .90 | .90 | .90 | .88 | .88 |
| 25-25.9 | .98 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | 1.05 | .. | 1.05 | 1.05 | .. | 1.01 | 1.00 | 1.01 | .. | .95 | .95 | .95 | .91 | .91 |
| 26-26.9 | 1.02 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | 1.09 | .. | 1.09 | 1.09 | .. | 1.04 | 1.04 | 1.04 | .. | 1.00 | 1.00 | 1.00 | .94 | .94 |
| 27-27.9 | 1.06 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | 1.13 | .. | 1.13 | 1.13 | .. | 1.07 | 1.08 | 1.07 | .. | 1.05 | 1.05 | 1.05 | .98 | .97 |
| 28-28.9 | 1.10 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | 1.17 | .. | 1.17 | 1.17 | .. | 1.10 | 1.12 | 1.10 | .. | 1.10 | 1.10 | 1.10 | 1.02 | .. |
| 29-29.9 | 1.14 | 1.21 | 1.21 | 1.21 | .. | 1.21 | 1.21 | .. | .. | 1.21 | .. | 1.13 | 1.16 | 1.15 | .. | 1.16 | 1.16 | 1.16 | 1.06 | .. |
| 30-30.9 | 1.18 | 1.25 | 1.25 | 1.25 | .. | 1.25 | 1.25 | .. | .. | 1.25 | .. | 1.16 | 1.20 | 1.20 | .. | 1.22 | 1.22 | 1.22 | 1.10 | .. |
| 31-31.9 | 1.23 | 1.30 | 1.30 | 1.30 | .. | .. | 1.30 | .. | .. | .. | .. | .. | .. | 1.25 | .. | 1.28 | 1.28 | 1.28 | 1.14 | .. |
| 32-32.9 | 1.28 | 1.35 | 1.35 | 1.35 | .. | .. | 1.35 | .. | .. | .. | .. | .. | .. | 1.30 | .. | 1.34 | 1.34 | 1.34 | 1.18 | .. |
| 33-33.9 | .. | .. | .. | .. | .. | .. | 1.41 | .. | .. | .. | .. | .. | .. | 1.35 | .. | 1.40 | 1.40 | 1.40 | 1.22 | .. |
| 34-34.9 | .. | .. | .. | .. | .. | .. | 1.47 | 1.16 | .. | .. | .. | .. | .. | 1.40 | .. | .. | .. | 1.46 | 1.26 | .. |
| 35-35.9 | .. | .. | .. | .. | .. | .. | 1.53 | 1.22 | .. | .. | .. | .. | .. | 1.45 | .. | .. | .. | .. | 1.30 | .. |
| 36-36.9 | .. | .. | .. | .. | .. | .. | 1.59 | 1.28 | .. | .. | .. | .. | .. | 1.50 | .. | .. | .. | .. | .. | .. |
| 37-37.9 | .. | .. | .. | .. | .. | .. | 1.65 | 1.34 | .. | .. | .. | .. | .. | 1.55 | .. | .. | .. | .. | .. | .. |
| 38-38.9 | .. | .. | .. | .. | .. | .. | 1.71 | 1.40 | .. | .. | .. | .. | .. | 1.60 | .. | .. | .. | .. | .. | .. |
| 39-39.9 | .. | .. | .. | .. | .. | .. | 1.77 | 1.46 | .. | .. | .. | .. | .. | 1.65 | .. | .. | .. | .. | .. | .. |
| 40-40.9 | .. | .. | .. | .. | .. | .. | 1.83 | 1.52 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 41-41.9 | .. | .. | .. | .. | .. | .. | 1.89 | 1.58 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |
| 42-42.9 | .. | .. | .. | .. | .. | .. | 1.95 | 1.64 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. |

KETTLEMAN HILLS—55 degrees Gravity and above $1.65 per barrel. *Union Oil Company. †Changed March 18, 1929.

*(See Page 201)*

# CRUDE OIL PRICE QUOTATIONS (*Continued from Page 219*)

### WEST TEXAS

(Effective Jan. 15, 1930)

Crane-Upton, Crockett, Howard, Pecos and Winkler Counties and Lea County, N. Mex.

| | |
|---|---|
| Below 25 gravity | $ .55 |
| 25 to 25.9 gravity | .58 |
| 26 to 26.9 gravity | .61 |
| 27 to 27.9 gravity | .64 |
| 28 to 28.9 gravity | .67 |
| 29 to 29.9 gravity | .70 |
| 30 to 30.9 gravity | .73 |
| 31 to 31.9 gravity | .76 |
| 32 to 32.9 gravity | .79 |
| 33 to 33.9 gravity | .82 |
| 34 to 34.9 gravity | .85 |
| 35 to 35.9 gravity | .88 |
| 36 and above | .91 |

Magnolia posts in Crane, Upton and Winkler Counties. Southern Crude Oil Purchasing Company posts only in Crane, Upton and Winkler Counties.

### HOWARD AND GLASSCOCK COUNTY CRUDE

(Effective Jan. 15. 1930)

| | |
|---|---|
| Below 25 gravity | $ .55 |
| 25 to 25.9 gravity | .58 |
| 26 to 26.9 gravity | .61 |
| 27 to 27.9 gravity | .64 |
| 28 to 28.9 gravity | .66 |
| 29 to 29.9 gravity | .68 |
| 30 to 30.9 gravity | .70 |
| 31 to 31.9 gravity | .72 |
| 32 to 32.9 gravity | .74 |
| 33 to 33.9 gravity | .76 |
| 34 to 34.9 gravity | .78 |
| 35 to 35.9 gravity | .80 |
| 36 and above | .82 |

### MARKHAM

The Texas Company

(Effective Jan. 15, 1930)

| | |
|---|---|
| All grades | $ .75 |

### CORSICANA HEAVY AND LULING

| | |
|---|---|
| All grades | $ .75 |

### SALT FLAT AND DARST CREEK

| | |
|---|---|
| All grades | $1.05 |

### NORTH AND CENTRAL TEXAS

(Effective Jan. 15, 1930)

**Ranger, North Texas, Mexia, Powell, Richland, Wortham, Currie, Moran, Nocona and Lytton Springs Crude**

**(Humble Oil and Refining Company)**

| | |
|---|---|
| Below 25 gravity | $ .60 |
| 25 to 25.29 gravity | .66 |
| 26 to 26.9 gravity | .72 |
| 27 to 27.9 gravity | .78 |
| 28 to 28.9 gravity | .84 |
| 29 to 29.9 gravity | .90 |
| 30 to 30.9 gravity | .96 |
| 31 to 31.9 gravity | 1.02 |
| 32 to 32.9 gravity | 1.08 |
| 33 to 33.9 gravity | 1.11 |
| 34 to 34.9 gravity | 1.14 |
| 35 to 35.9 gravity | 1.17 |
| 36 to 36.9 gravity | 1.20 |
| 37 to 37.9 gravity | 1.23 |
| 38 to 38.9 gravity | 1.26 |
| 39 to 39.9 gravity | 1.29 |
| 40 to 40.9 gravity | 1.32 |
| 41 to 41.9 gravity | 1.35 |
| 42 to 42.9 gravity | 1.38 |
| 43 to 43.9 gravity | 1.41 |
| 44 and above | 1.44 |

### SOUTH TEXAS

| | |
|---|---|
| Mirando | $ .75 |

### CLASSIFICATIONS OF GULF COAST CRUDE

**The Texas Company:** GRADE A—Beaume gravity not over 26.0 degrees at 60 degrees Fahrenheit; sulphur not over 0.5 per cent; in distilling 500 cc. of the crude that part of the distillate cut between 65 per cent off and 85 per cent off shall have a pour test of zero or lower. GRADE B—All Gulf Coast heavy crudes which do not meet tests for Grade "A" or for Gulf Coast light.

**Humble Oil & Refining Company:** GRADE A—All crude conforming to the following tests: viscosity not less than 100 seconds Saybolt at 100 degrees Fahrenheit; sulphur not over .4 per cent; Beaume gravity not over 25 at 60 degrees Fahrenheit. Cold tests of distillates having a viscosity of 1000 seconds at 100 degrees Fahrenheit shall not be over 5 degrees Fahrenheit. GRADE B—Embraces all Coastal crude which does not meet the tests for "A" grade crude.

**Gulf Pipe Line Company:** GRADE A—Beaume gravity not over 24 at 60 degrees Fahrenheit; viscosity not less than 100 seconds universal Saybolt at 100 degrees Fahrenheit; and sulphur not over 0.4 per cent. The yield of 250 viscosity reduced distillate at 100 degrees Fahrenheit not less than 30 per cent, and this 30 per cent not heavier than 20 Beaume, and its pour test not above zero Fahrenheit. The reduced distillate to be secured by reducing the crude with fire and steam until the bottoms have a flash of not less than 540 degrees Fahrenheit, and not more than 560 degrees Fahrenheit open cup, and the entire distillate obtained n this way reduced to a distillate of 250 viscosity. The 10 per cent cut in the original distillate having an average viscosity of 500 seconds at 100 degrees Fahrenheit to have a pour test not higher than 5 degrees Fahrenheit. GRADE B—Embraces crude which does not meet test for "A" grade.

**Sun Pipe Line Company:** GRADE A—Viscosity not less than 100 seconds at 100 degrees Fahrenheit Saybolt. Sulphur not over .4 per cent. Beaume gravity not over 25 at 60 degrees Fahrenheit. Cold Test: of distillates having viscosity of 1000 seconds at 100 degrees Fahrenheit shall not be over 5 degrees Fahrenheit A. S. T. M. Method. GRADE B—All Coastal crudes which do not meet specifications for Grade A crude.

### GULF COAST

(Effective January 15, 1930)

| | |
|---|---|
| Grade "A" all companies | 1.05 |

**Grade "B"**

| | |
|---|---|
| Below 25 gravity | $ .90 |
| 25 to 25.9 gravity | .93 |
| 26 to 26.9 gravity | .96 |
| 27 to 27.9 gravity | .99 |
| 28 to 28.9 gravity | 1.02 |
| 29 to 29.9 gravity | 1.05 |
| 30 to 30.9 gravity | 1.08 |
| 31 to 31.9 gravity | 1.11 |
| 32 to 32.9 gravity | 1.14 |
| 33 to 33.9 gravity | 1.17 |
| 34 to 34.9 gravity | 1.20 |
| 35 and above | 1.23 |

### REFUGIO

Gulf Coast Oil Co.

(Effective January 15, 1930)

| | |
|---|---|
| Below 25 gravity (Heavy) | .55 |

**REFUGIO (Light)**

| | |
|---|---|
| 30 to 30.9 gravity | .95 |
| 31 to 31.9 gravity | .98 |
| 32 to 32.9 gravity | 1.01 |
| 33 to 33.9 gravity | 1.04 |
| 34 to 34.9 gravity | 1.07 |
| 35 and above | 1.10 |

### BRENHAM

Sun Oil Company

| | |
|---|---|
| All grades | 1.10 |

### WYOMING-MONTANA

(Effective February 15, 1930)

Wyoming

| | |
|---|---|
| Byron | $1.33 |
| Ferris | 1.60 |
| Elk Basin | 1.45 |
| Grass Creek | 1.45 |
| Rock Creek | 1.25 |
| Lost Soldier | 1.05 |
| Lance Creek | 1.53 |
| Mule Creek | 1.20 |
| Notches | .65 |
| Big Muddy | 1.33 |
| Osage | 1.65 |
| Hamilton Dome | .85 |
| Pilot Butte | 1.75 |
| Torchlight-Greybull | 1.65 |
| Lander | .80 |
| Rex Lake | 1.10 |
| South Casper Creek-Poison Spider | 1.00 |

### SALT CREEK

Midwest Refining Company

| | |
|---|---|
| 29 to 29.9 gravity | $ .90 |
| 30 to 30.9 gravity | .96 |
| 31 to 31.9 gravity | 1.02 |
| 32 to 32.9 gravity | 1.08 |
| 33 to 33.9 gravity | 1.11 |
| 34 to 34.9 gravity | 1.14 |
| 35 to 35.9 gravity | 1.17 |
| 36 to 36.9 gravity | 1.20 |
| 37 and above | 1.23 |

### MONTANA

(Effective February 15, 1930)

| | |
|---|---|
| Sunburst | 1.65 |
| Cat Creek | 1.48 |
| Lake Basin | 2.20 |

### NEW MEXICO

| | |
|---|---|
| Artesia | 1.03 |
| Hog Back | 1.43 |
| Maljamar | 95 |
| Jal and Lea | * |

(*) West Texas price scale used by The Texas Company and Humble Oil & Refining Co.

### CANADA

(Effective February 15, 1930)

| | |
|---|---|
| Oil Springs | 2.12 |
| Petrolia | 2.05 |

### LOUISIANA-ARKANSAS

(Effective Jan. 16, 1930)

**Homer, Haynesville, Caddo, El Dorado, De Soto and Crichton and Cotton Valley***
**(Atlantic Oil Producing Company, Standard of Louisiana, Magnolia Petroleum Company and The Texas Company.)**

| | |
|---|---|
| 27 to 27.9 gravity | $ .78 |
| 28 to 28.9 gravity | .84 |
| 29 to 29.9 gravity | .90 |
| 30 to 30.9 gravity | .96 |
| 31 to 31.9 gravity | 1.02 |
| 32 to 32.9 gravity | 1.08 |
| 33 to 33.9 gravity | 1.11 |
| 34 to 34.9 gravity | 1.14 |
| 35 to 35.9 gravity | 1.17 |
| 36 to 36.9 gravity | 1.20 |
| 37 to 37.9 gravity | 1.23 |
| 38 to 38.9 gravity | 1.26 |
| 39 to 39.9 gravity | 1.29 |
| 40 to 40.9 gravity | 1.32 |
| 41 to 41.9 gravity | 1.35 |
| 42 to 42.9 gravity | 1.38 |
| 43 to 43.9 gravity | 1.41 |
| 44 gravity and above | 1.44 |

*Shreveport-Eldorado's postings stop at above 40 gravity.

The posting on Cotton Valley is same as Caddo. From 36 to 52 and above the regular gravity schedule is followed.

The Texas Company pays North Texas gravity scale in North Louisiana.

### STEPHENS

(All Companies)

| | |
|---|---|
| Below 28 gravity | $ .70 |
| 28 to 28.9 gravity | .75 |
| 29 to 29.9 gravity | .80 |
| 30 to 30.9 gravity | .85 |
| 31 to 31.9 gravity | .90 |
| 32 gravity and above | .95 |

### SMACKOVER

(All Companies)

| | |
|---|---|
| Below 24 gravity | $ .85 |
| 24 and above | 1.00 |

# United States Daily Average Production

*Figures below are taken from the complete revised estimates of the AMERICAN PETROLEUM INSTITUTE except for the current week, which are advance estimates issued by the A. P. I. and are subject to revision:*

| 1929 | Oklahoma | Kansas | Texas (Outside Gulf Coast) | Gulf Coast | North Louisiana | Arkansas | Eastern States | Rocky Mountain | California | United States Daily Av. | United States Total |
|---|---|---|---|---|---|---|---|---|---|---|---|
| January | 722,550 | 97,150 | 632,500 | 136,750 | 36,650 | 78,600 | 111,950 | 73,200 | 747,250 | 2,635,600 | 81,703,600 |
| February | 714,800 | 95,950 | 643,350 | 142,300 | 35,700 | 74,600 | 108,550 | 71,750 | 797,800 | 2,684,800 | 75,204,400 |
| March | 666,500 | 95,500 | 662,500 | 147,750 | 35,800 | 74,250 | 108,850 | 70,400 | 786,000 | 2,647,400 | 82,068,350 |
| April | 665,600 | 106,400 | 650,100 | 154,550 | 35,550 | 72,900 | 110,850 | 69,400 | 781,350 | 2,646,700 | 79,402,100 |
| May | 679,650 | 115,400 | 651,100 | 150,350 | 35,350 | 71,500 | 114,150 | 72,850 | 749,250 | 2,639,600 | 81,827,600 |
| June | 685,200 | 120,750 | 688,200 | 147,500 | 35,700 | 70,050 | 116,750 | 72,000 | 827,200 | 2,763,400 | 82,902,250 |
| July | 722,050 | 124,250 | 718,950 | 148,150 | 35,750 | 68,650 | 122,000 | 74,250 | 874,850 | 2,888,900 | 89,555,250 |
| August | 728,100 | 127,950 | 750,750 | 153,100 | 36,300 | 66,900 | 126,600 | 77,900 | 873,300 | 2,940,900 | 91,167,250 |
| September | 714,050 | 128,450 | 741,200 | 156,600 | 37,050 | 65,300 | 137,250 | 78,600 | 874,850 | 2,933,350 | 88,000,650 |
| October | 673,600 | 113,400 | 714,550 | 167,050 | 39,700 | 64,550 | 137,400 | 77,950 | 876,600 | 2,864,800 | 88,809,500 |
| November | 640,300 | 110,050 | 702,350 | 171,350 | 36,750 | 63,700 | 135,400 | 76,550 | 706,500 | 2,642,800 | 79,285,050 |
| December | 650,000 | 111,600 | 687,850 | 161,350 | 38,700 | 61,850 | 140,650 | 76,150 | 698,200 | 2,626,350 | 81,417,000 |
| 1930 | | | | | | | | | | | |
| January | 671,050 | 111,700 | 672,650 | 178,300 | 37,650 | 58,500 | 142,250 | 73,850 | 688,850 | 2,634,800 | 81,574,650 |
| February 1 | 612,000 | 110,400 | 655,900 | 195,050 | 36,500 | 57,250 | 138,650 | 78,650 | 710,600 | 2,595,000 | 18,165,000 |
| February 8 | 631,650 | 110,450 | 656,700 | 199,500 | 37,600 | 58,700 | 137,000 | 74,300 | 707,900 | 2,613,800 | 18,296,600 |
| February 15 | 632,700 | 110,500 | 652,750 | 200,100 | 37,550 | 58,400 | 135,100 | 74,850 | 751,000 | 2,652,950 | 18,570,650 |
| February 22 | 646,800 | 110,600 | 654,100 | 197,950 | 41,700 | 58,150 | 134,200 | 72,550 | 806,000 | 2,722,050 | 19,054,350 |
| March 1 | 617,200 | 114,700 | 654,600 | 203,450 | 41,800 | 58,500 | 133,050 | 77,550 | 723,000 | 2,623,950 | 18,367,650 |
| March 8 | 604,300 | 113,650 | 648,500 | 205,350 | 41,750 | 58,100 | 133,600 | 68,700 | 661,400 | 2,535,350 | 17,747,450 |
| Increase | ..... | ..... | ..... | 1,900 | ..... | ..... | 550 | ..... | ..... | ..... | ..... |
| Decrease | 12,900 | 1,050 | 6,100 | ..... | 50 | 400 | ..... | 8,850 | 61,600 | 88,600 | 620,200 |

## TEXAS
(Outside Gulf Coast)

### PANHANDLE DISTRICT

| | Mar. 8 | Mar. 1 |
|---|---|---|
| Carson County | 8,900 | 9,000 |
| Gray County | 53,300 | 54,900 |
| Hutchinson County | 23,500 | 23,500 |
| Wheeler County | 600 | 600 |
| Others | 600 | 700 |
| Total | 86,900 | 89,100 |

### NORTH TEXAS

| | | |
|---|---|---|
| Archer County | 17,250 | 17,300 |
| Burkburnett | 8,150 | 8,150 |
| Electra | 11,400 | 11,400 |
| Iowa Park-KMA | 5,100 | 5,100 |
| Montague and Cooke Cos. | 11,100 | 11,100 |
| Wilbarger | 23,400 | 24,600 |
| Others | 2,200 | 2,200 |
| Total | 78,600 | 79,850 |

### WEST CENTRAL TEXAS

| | | |
|---|---|---|
| Brown County | 7,950 | 8,800 |
| Callahan County | 3,700 | 3,300 |
| Coleman County | 4,950 | 5,500 |
| Eastland-Desdemona | 5,600 | 5,700 |
| Jack County | 4,400 | 4,450 |
| Palo Pinto County | 750 | 600 |
| Shackelford County | 8,400 | 8,500 |
| Stephens County | 5,850 | 5,250 |
| Throckmorton County | 900 | 700 |
| Young County | 9,350 | 8,550 |
| Others | 1,450 | 1,300 |
| Total | 53,300 | 52,650 |

### WEST TEXAS

| | | |
|---|---|---|
| Crane-Upton Counties | 45,000 | 45,500 |
| Crockett County | 2,200 | 2,200 |
| Howard County | 37,500 | 37,900 |
| Jones County | 2,100 | 2,100 |
| Mitchell-Scurry Cos. | 2,300 | 2,400 |
| Yates | 132,500 | 133,050 |
| Pecos County | 6,400 | 6,500 |
| Reagan County | 16,700 | 16,800 |
| Winkler County | 91,000 | 92,6000 |
| Others | 3,450 | 3,400 |
| Total | 339,150 | 342,450 |

### EAST CENTRAL TEXAS

| | | |
|---|---|---|
| Boggy Creek | 3,900 | 3,500 |
| Corsicana-Powell | 6,050 | 6,000 |
| Currie | 350 | 350 |
| Mexia | 4,200 | 4,300 |
| Nigger Creek | 200 | 200 |
| Richland | 250 | 250 |
| Wortham | 900 | 900 |
| Van Zandt | 10,200 | 9,600 |
| Total | 26,050 | 25,100 |

### SOUTHWEST TEXAS

| | | |
|---|---|---|
| Darst Creek | 16,000 | 15,800 |
| Dale | 300 | 300 |
| Laredo District | 8,900 | 8,850 |
| Luling | 10,300 | 10,400 |
| Lytton Springs | 900 | 900 |
| Somerset | 1,400 | 1,400 |
| Salt Flat | 24,200 | 25,200 |
| Others | 2,500 | 2,600 |
| Total | 64,500 | 64,450 |
| T'tl Tex. (Outside Gulf Coast) | 648,500 | 654,500 |

### TEXAS GULF COAST

| | | |
|---|---|---|
| Barbers Hill | 23,900 | 24,500 |
| Batson | 1,200 | 1,200 |
| Big Creek | 3,200 | 3,150 |
| Blue Ridge | 1,900 | 1,700 |
| Boling | 1,000 | 1,050 |
| Damon Mound | 500 | 500 |
| Goose Creek | 4,900 | 4,900 |
| Hull | 9,250 | 9,250 |
| Humble | 22,500 | 18,350 |
| Orange County | 2,450 | 2,200 |
| Pierce Junction | 10,700 | 11,300 |
| Raccoon Bend | 12,000 | 11,800 |
| Refugio | 37,400 | 36,300 |
| Satatoga | 1,0 0 | 1,000 |
| Sour Lake | 2,350 | 2,350 |
| South Liberty | 5,000 | 5,500 |
| Spindle Top | 16,300 | 17,300 |
| Sugar Land | 11,950 | 12,200 |
| West Columbia | 6,000 | 6,100 |
| Clay Creek | 1,700 | 1,600 |
| Fannett | 1,200 | 1,050 |
| Port Neches | 2,900 | 2,200 |
| North Dayton | 900 | 1,000 |
| Others | 4,300 | 4,100 |
| Total | 184,550 | 180,500 |
| Texas Total | 833,050 | 835,100 |

## OKLAHOMA

| | | |
|---|---|---|
| Asher | 2,500 | 2,300 |
| Carr City | 9,250 | 10,400 |
| Logan County | 9,650 | 10,000 |
| Braman | 3,600 | 3,650 |
| Blackwell | 3,100 | 3,100 |
| Hubbard | 1,500 | 1,500 |
| Thomas | 450 | 500 |
| Tonkawa | 8,350 | 8,350 |
| Garber | 4,500 | 4,450 |
| Burbank | 16,600 | 16,600 |
| Osage (outside Burbank) | 26,350 | 26,350 |
| Cushing | 14,400 | 14,400 |
| Yale Jennings | 8,150 | 7,850 |
| Davenport | 1,150 | 1,200 |
| Bristow Slick | 16,400 | 16,450 |
| North Okmulgee | 11,300 | 11,300 |
| South Okmulgee | 6,250 | 6,250 |
| Cromwell | 7,400 | 7,250 |
| Papoose | 2,950 | 2,850 |
| Wewoka | 4,000 | 4,050 |
| Seminole | 20,200 | 21,050 |
| East Seminole | 3,350 | 3,250 |
| Bowlegs | 19,600 | 21,250 |
| Searight | 9,150 | 9,250 |
| Little River | 38,100 | 42,000 |
| East Little River | 19,350 | 15,050 |
| Earlsboro | 33,350 | 33,500 |
| East Earlsboro | 41,750 | 38,500 |
| Duncan District | 7,900 | 7,850 |
| Graham | 3,750 | 3,700 |
| Fox | 1,300 | 1,200 |
| Healdton | 12,000 | 11,950 |
| Hewitt | 7,550 | 7,450 |
| Scholem Alechem | 13,800 | 13,800 |
| Pearson | 850 | 750 |
| St. Louis | 42,850 | 43,650 |
| Allen | 20,400 | 19,050 |
| Maud | 5,350 | 5,800 |
| Mission | 11,250 | 12,800 |
| Oklahoma City | 63,000 | 83,900 |
| Sasakwa | 9,300 | 9,250 |
| Others | 53,800 | 53,200 |
| Konawa | 8,500 | 7,200 |
| Total | 604,300 | 617,200 |

## CALIFORNIA

| | | |
|---|---|---|
| Santa Fe Springs | 159,000 | 166,000 |
| Long Beach | 104,000 | 111,000 |
| Huntington Beach | 31,500 | 41,000 |
| Dominguez | 10,000 | 10,500 |
| Inglewood | 18,200 | 22,000 |
| Midway-Sunset | 74,500 | 73,000 |
| Ventura Avenue | 44,600 | 53,900 |
| Seal Beach | 25,800 | 29,800 |
| Elwood-Goleta | 36,800 | 41,800 |
| Kettleman Hills | 13,000 | 13,000 |
| Others | 144,000 | 161,000 |
| Total | 661,400 | 723,000 |

## KANSAS

| | | |
|---|---|---|
| Greenwood County | 19,400 | 19,500 |
| Florence-Covert | 850 | 850 |
| Peabody-Ebling | 3,150 | 3,150 |
| Eldorado-Towanda | 13,400 | 13,450 |
| Augusta-Fox Bush | 2,900 | 2,900 |
| Rainbow Bend | 1,100 | 1,100 |
| Russell | 3,500 | 3,250 |
| Churchill | 4,500 | 4,600 |
| Oxford | 2,900 | 2,850 |
| Sedgwick | 22,050 | 23,500 |
| Others | 35,000 | 34,600 |
| Voshel | 4,900 | 4,950 |
| Total | 113,650 | 114,700 |

## NORTH LOUISIANA

| | Mar. 8 | Mar. 1 |
|---|---|---|
| Homer | 3,550 | 3,600 |
| Haynesville | 4,500 | 4,550 |
| Caddo Light | 10,400 | 10,350 |
| Caddo Heavy | 2,650 | 2,700 |
| DeSoto-Red River | 3,050 | 3,100 |
| Elm Grove | 450 | 450 |
| Bellevue | 650 | 600 |
| Cotton Valley | 2,250 | 2,100 |
| Urania | 5,050 | 5,000 |
| Pleasant Hill | 700 | 750 |
| Zwolle | 5,400 | 5,300 |
| Others | 3,100 | 3,300 |
| Total North Louisiana | 41,750 | 41,800 |

## LOUISIANA GULF COAST

| | | |
|---|---|---|
| Port Barre | 2,200 | 3,050 |
| Bayou Boullion | 50 | 50 |
| East Hackberry | 1,200 | 1,350 |
| Hackberry | 1,200 | 1,250 |
| Edgerly | 550 | 650 |
| Evangeline | 1,100 | 1,100 |
| Lockport | 2,900 | 3,000 |
| Sorrento | 100 | 100 |
| Sulphur Dome | 6,000 | 6,600 |
| Vinton | 4,000 | 4,050 |
| Others | 1,500 | 1,750 |
| Total Louisiana Gulf Coast | 20,800 | 22,950 |
| Louisiana Total | 62,550 | 64,750 |

## ARKANSAS

| | | |
|---|---|---|
| El Dorado | 4,000 | 4,100 |
| Champagnolle | 4,300 | 4,300 |
| Smackover Light | 5,300 | 5,150 |
| Smackover Heavy | 41,200 | 41,650 |
| Stephens | 900 | 950 |
| Nevada | 1,100 | 1,100 |
| Lisbon | 1,050 | 1,000 |
| Others | 250 | 250 |
| Total | 58,100 | 58,500 |

## MOUNTAIN STATES

### WYOMING

| | | |
|---|---|---|
| Salt Creek | 26,250 | 33,950 |
| Grass Creek | 2,050 | 2,050 |
| Elk Basin | 700 | 750 |
| Big Muddy | 2,0 0 | 2,050 |
| Lost Soldier | 3,100 | 3,450 |
| Rock River | 2,250 | 2,200 |
| Lance Creek | 150 | 150 |
| Oregon Basin | 3,900 | 3,900 |
| La Barge | 2,050 | 2,400 |
| Others | 2,550 | 2,750 |
| Total | 45,050 | 53,650 |

### MONTANA

| | | |
|---|---|---|
| Cat Creek | 1,250 | 1,250 |
| Sunburst | 4,950 | 4,950 |
| Pondera | 2,100 | 2,400 |
| Others | 50 | 50 |
| Total | 8,350 | 8,650 |

### COLORADO

| | | |
|---|---|---|
| Moffats (Craig) | 1,050 | 1,150 |
| Fort Collins | 1,600 | 1,550 |
| Florence | 550 | 750 |
| Others | 1,450 | 1,500 |
| Total | 4,650 | 4,950 |

### NEW MEXICO

| | | |
|---|---|---|
| Table Mesa | 100 | 100 |
| Artesia | 700 | 700 |
| Hogback | 450 | 400 |
| Rattlesnake | 1,150 | 700 |
| Bal. Lea & Eddy Co.'s | 7,300 | 7,450 |
| Others | 950 | 950 |
| Total | 10,650 | 10,300 |
| Total Mountain States | 68,700 | 77,505 |

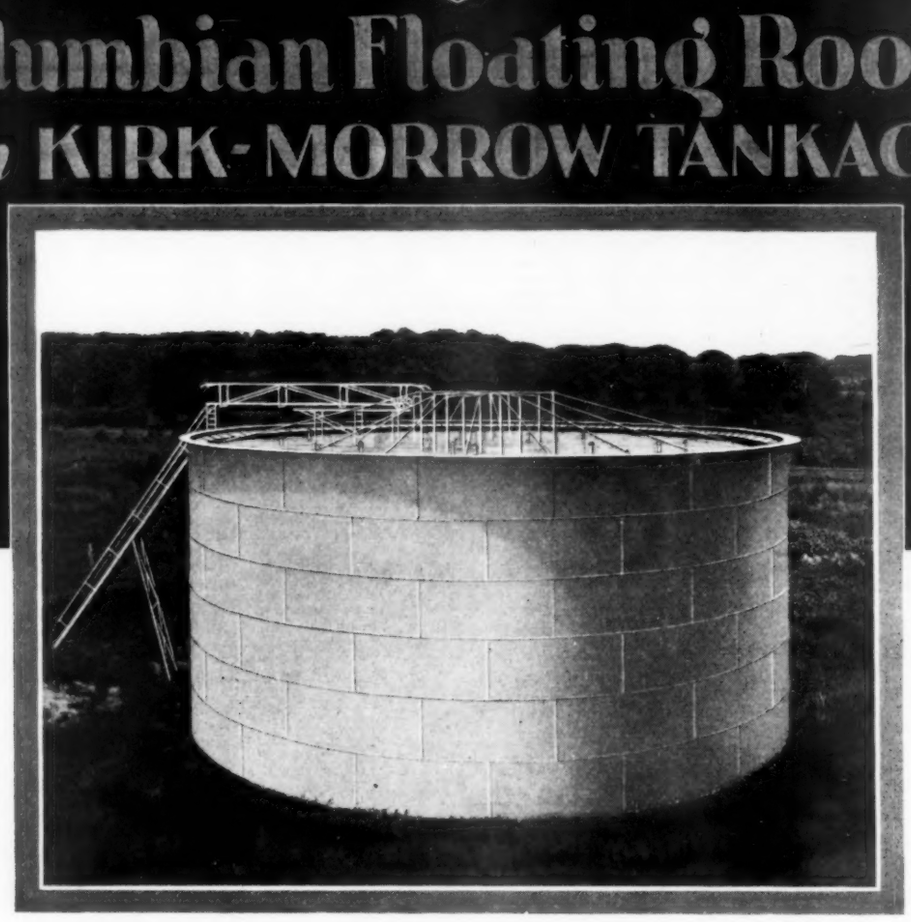
## EASTERN STATES

| | | |
|---|---|---|
| (Including Ill., Ind., O., W. Va., Pa., N. Y., Ky.) | 120,000 | 119,500 |
| Michigan | 13,600 | 13,550 |
| Total Eastern States | 133,600 | 133,050 |

## PRODUCTION SUMMARY

| | | |
|---|---|---|
| East of Rockies | 1,805,250 | 1,823,400 |
| Total U. S. | 2,535,350 | 2,623,950 |

# Columbian Floating Roofs *On* KIRK-MORROW TANKAGE



THE Kirk-Morrow Iron Works Company, largest fabricator and erector of steel tankage located in the Mid-Continent Field, is now licensed to manufacture, sell and install the Columbian Steel Tank Company's Floating Roof. By floating on the oil, this roof leaves no space for the formation of combustible vapors, thereby eliminating the fire hazard and loss by evaporation.

KM CO, in selecting Columbian's Floating Roof for KM CO Tankage, exercised the same careful judgment that has distinguished its personnel in meeting the needs of the oil industry for over twenty-five years. KM CO is now prepared to offer steel tanks of from 500 barrel to 120,000 barrel capacity, either in standard design or equipped with the Columbian Floating Roof.

*Also Furnish Tanks Built In Accordance With A.P.I. Specifications*

PRODUCTS

Steel Derricks, Rig Irons, Bull Wheels, Calf Wheels, Band Wheels, Crown Blocks, Tug Wheels, Sand Reels, Steel Tankage, Floating Roofs, Tank Fittings, Refinery Equipment, Steel Plate Construction.

## THE KIRK-MORROW IRON WORKS COMPANY

Sales Offices: Hunt Bldg., Tulsa, Okla.; Magnolia Bldg., Dallas, Texas; Central Bldg., Wichita, Kan.

# PERSONAL MENTION-MEN YOU KNOW

**More than** 1300 oil men from all parts of California attended the twenty-third annual banquet of the California Oil and Gas Association, held Thursday evening, March 6, at the Biltmore Hotel. Herbert R. Macmillan, president of the organization, delivered the opening address. E. B. Reeser, president of the American Petroleum Institute, addressed the meeting on "The Oil Industry as I See it." Edwards Davis acted as toastmaster. In addition to Mr. Reeser, Thomas O'Donnell and E. W. Clark, past presidents of the American Petroleum Institute, sat at the speakers' table, accounting for three of the four presidents of the organization.

Mr. Reeser presented a comprehensive picture of the oil industry, stressing the necessity of reducing production and refinery runs to actual needs.

Herbert R. Macmillan made a strong plea for co-operation of operators in a common effort to stabilize the industry in California and to play fair with other states now bringing production under control.

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**R. L. Gay,** Shreveport, underwent an operation at Mayo Brothers hospital at Rochester, Minnesota, March 10, for a stomach ailment. He stood the operation successfully, according to advices late Monday.

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**Robert T. Hatcher,** purchasing agent for the Woodley Petroleum Company, died at Shreveport, Louisiana, Friday, March 7 after an illness of two months. His widow and four children survive. Interment was at Many, Louisiana, former home of deceased. He had been connected with the Woodley Petroleum Company for 10 years at Shreveport and El Dorado, Arkansas.

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**Herbert L. Pratt,** chairman of the board, Chas. F. Meyer, president, and A. F. Corwin, director, of Standard Oil Company of New York, were guests in Dallas several days last week of E. R. Brown, president of the Magnolia Petroleum Company. The party made several short inspection trips or properties held by Magnolia Petroleum Company in Texas, and previously had been on an outing in Florida. Meyer is recuperating from an operation, and will spend a number of weeks in California before returning to the general offices of the company in New York City.

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**C. A. Gander,** A. S. Gander, H. Anissinov, N. D. Elin, L. A. Ladygin, N. I. Nerenberg, V. P. Lisako, G. S. Tomaschevsky, W. C. Pissakov, V. M. Korobovkin, M. I. Alexeev and P. A. Berejanoff are among Russian engineers attending the Oil Equipment and Engineering Exposition. These engineers will also make an extended study of the oil industry in the United States for the Soviet.

**B. P. Boots,** of the technical department of the Royal Dutch Shell at The Hague, is in Los Angeles to attend the Oil Equipment and Engineering Exposition.

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**P. D. Bowlen,** president and general manager of Wainright-West Oils, Ltd., of Toronto, Canada, visited Dallas and other points in Texas during the past week in connection with a wildcat test being started by his company in Northeast Texas.

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**S. M. Gilkey** recently was transferred from the Bartlesville office of the Indian Territory Illuminating Oil Company to the Oklahoma City office to serve as production department clerk and office assistant to A. V. Hoenig, vice-president in charge of production.

Gilkey began with H. V. Foster, president of Indian Territory, Illuminating Oil Company in 1905 in charge of the oil and gas production in northern Osage County, Oklahoma. In 1910 he was transferred to Bigheart (now Barnsdall), in charge of gas distribution.

In July, 1917, he was transferred to Pawhuska, and given the position of secretary and general superintendent of the Pawhuska Oil & Gas Company, a company subsidiary. He was moved to Bartlesville in May, 1920, to serve as assistant superintendent of oil and gas production, in a similar position to which he occupied when transferred to Oklahoma City.

His father, Colonel R. W. Gilkey, was one of the earliest oil operators in the Mid-Continent, having had producing properties in Osage County, Oklahoma, in 1902.

S. M. GILKEY

**E. B. Reeser,** president of the American Petroleum Institute and head of Barnsdall Oil Corporation, is spending a short time in California.

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**Judge E. D. Reiter,** prominent in California conservation circles, and Miss Charlotte Temple Logan of Los Angeles were married in Santa Barbara on March 1. After an extended honeymoon they will be at home in Los Angeles.

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**Hale B. Soyster,** supervisor for the United States Geological Survey in the Mid-Continent, has recently been appointed supervisor of the mineral leasing division of the survey with Casper headquarters. Mr. Soyster succeeds Jack Steele who recently resigned to go with the Sinclair interests in Africa. W. H. Strang, who has been acting supervisor since Mr. Steele's departure, has been in New York City and Washington, and will return to Casper shortly.

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London (By mail).—Dr. A. E. Dunston, D. Sc., F. I. C., F. C. S., chief chemist for Anglo-Persian Oil Company, was re-elected president of The Institution of Petroleum Technologists at a meeting of the Council of that body held in London on February 11. A. E. Chambers, A. M. Inst. C. E., a director of Whitehall Petroleum Corporation, Ltd., was elected vice-president. Other vice-presidents, who include Major Sir Richard Barnett, M. A., president of British Controlled Oilfields, Ltd., Alexander Duckham, F. C. S., chairman of Trinidad Central Oilfields, Ltd., Arthur W. Eastlake, M. I. Min. E., A. M. I. Mech. E., consulting engineer, James Kewley, M. A., F. I. C., F. C. S., M. I. Chem. E., chief chemist for Asiatic Petroleum Company, and Robert Redwood, F. C. S., consulting engineer and adviser to the British government, who is a brother of the late Sir Boverton Redwood, founder and first president of the Institution.

Another election will be held at the meeting of the membership on March 11, at which date certain vacancies in the council will be filled.

After the election, which was held at Aldine House, Bedford Street, Strand, the members assembled at the Royal Society of Arts, where they heard and discussed a very interesting paper on "The Oilfields of Alberta," by E. H. Cunningham Craig, B. A., F. R. S. E., F. G. S., M. Inst. P. T., who predicted that the year 1930 may see a revival of boom conditions in the Turner Valley field.

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"Treat timber wherever possible"

'In poles treated with creosote in 1897, shipworm attack first appeared in 1920—after 23 years of service."

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**TEXAS CREOSOTING COMPANY**

ORANGE, TEXAS HOUSTON, TEXAS

# Texas Pipe Line Law Waiting Governor's Signature

AUSTIN. — Reorganization of the crude buying storage and pipe line transportation policies now in effect in Texas will result should a new law now awaiting the governor's signature be enforced. Majority vote by members of the Senate and House was given last week, but Governor Dan Moody had not affixed his signature to make the bill become a law up to Tuesday noon, March 11. The Governor announced late last week that he desired ample time to make a thorough study of the proposed legislation before giving it his written endorsement, although he had previously assured the supporters of the bill that he was in favor of it.

The proposed pipe line bill has been a live topic for discussion among oil men in Texas since it was introduced at Austin by the Independent Petroleum Association of Texas on February 77. The association was given birth in Fort Worth on February 22 as a sequel to the Mid-Continent campaign for tariff on petroleum imports, and immediately launched a drive to have legislation passed that would place all operations of crude purchasing companies and virtually all crude pipe lines under direct control of the Texas Railroad Commission.

Provisions also included in the bill would empower the commission to force oil purchasers and carriers to enlarge storage and line facilities to take care of new production without discriminating against producers of fields. Other features of the bill would give pipe line companies the status of a public utility, thereby paving the way for the association's proposed plan to bring about a sharp reduction of pipe line tariffs in the near future.

The independent association promoted a special train from Fort Worth consisting of independent operators, royalty owners and lease and royalty brookers, to arrive in Austin on February 27 so as to attract the attention of the law making bodies of the state when their special committee petitioned the governor to submit the bill.

More than 200 members and friends of the association were on hand to support the proposed legislation and a number remained in the capital city for several days to offer assistance to the legislation committee. The visitors impressed the state executives and members of the legislature by their numbers and enthusiasm, and succeeding in getting prompt action.

The bill was submitted to the legislature March 3, and on March 6 the senate voiced its approval by a vote of 22 to four. The house passed the bill on March 7 by a landslide vote of 91 to 14, or only nine short of the necessary two-thirds majority to put the act into effect immediately.

Prior to putting the measure to a vote the house committee on oil, gas and mines held public hearings to permit those opposing the bill to register their objections. Representatives of the Gulf Production Company, Magnolia Petroleum Company, and The Texas Company submitted testimony in opposition to the measure before the house committee, and were subjected to cross examination by members of the independent association also in attendance.

The pipe line bill is considered to be one of the most drastic measures pertaining to the oil industry in Texas to be acted upon in many years, and was put through the legislature in record time. Should the law become enforced the three members of the Texas Railroad Commission will be flooded with petitions from independent operators seeking the benefits provided for in the bill. The measure provides that the companies affected shall have 30 days after the act goes into effect to comply with same.

Companies adversely affected by the provisions of the pipe line and crude purchasing bill have generally remained silent on the issue, and will contest through court action any attempt to enforce features of the bill considered violative of constitutional rights. Tom E. Cranfill, president of the Cranfill-Reynolds Company, Dallas, is president of the independent association, and the four vice presidents are: Roy B. Jones, Panhandle Refining Company, Wichita Falls; Roy Westbrook, Westbrook and Company, Fort Worth; Lou D. Ladd, Fort Worth, lease broker; and Chas. Morgan, Fort Worth, attorney.

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Houston.—At the regular weekly luncheon of the Houston Geological Society at the University Club, Houston, on March 11, the main feature of the program was a discussion of plans for the New Orleans convention.

# A New Hazard for Pipe Lines

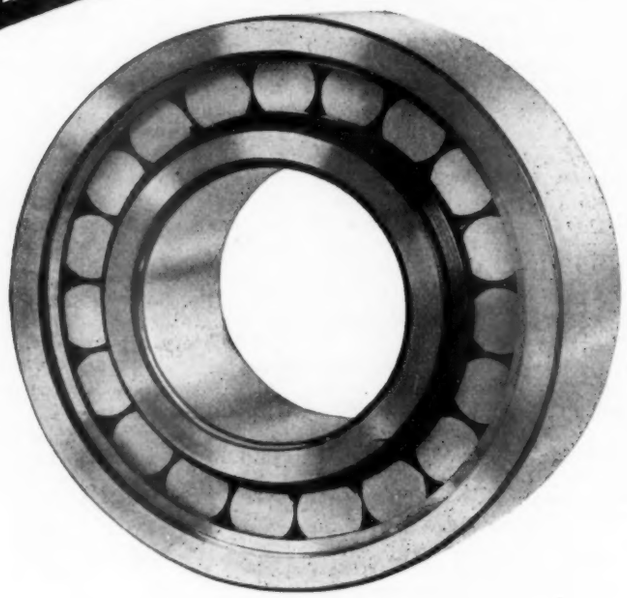
A NEW hazard for buried oil and gas pipe lines has bobbed up with the widespread usage of geophysical instruments by crews in carrying on their search for sub-surface data. Geophysical instruments that function through the aid of explosives are a great source of worry for a pipe line superintendent, and tolls have been taken in recent years by their operation.

Geophysical crews usually carry on their work in a secretive manner, and overlook the possible presence of buried lines occasionally in making discharges of explosives. The Gulf Coast district has been literally blanketed with shooting parties, and several months ago a geophysical crew spotted a charge of several thousand pounds of dynamite almost on top of two eight-inch lines carrying nearly a full capacity load of high gravity oil from Oklahoma and North Texas fields.

The blast obliterated a section of the two lines, and hurled the ends of the pipe from the ground for a long distance from the point of severance. The hole created by the explosives measured about 56 feet in diameter and 26 feet in depth, thus providing a receptacle for the escaping oil, which was salvaged except for losses by evaporation and seepage into the loose dirt. This particular pit was almost perfectly round, and the dirt was piled around the rim resembling a fire wall.

*When geophysical and transportation departments mixed*

# 19 YEARS



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# Oklahoma--Kansas Field Notes

WARREN BAKER, *Staff Representative, Tulsa, Oklahoma*

# Oklahoma City Field Gets Two Important Extensions

TULSA.—Two important extensions made to the Oklahoma City oil field the past week further enhance the value of the north and southeast extensions area, where most of the development is now taking place. Both producers proved several additional locations. The north and southeast areas are the only two spots surrounding the Oklahoma City field that look very good at this time and these two extension completions further the importance of the two regions. It is important that both areas are proving from the Detrital sand, the extent of whose producing area apparently depends upon how far the sand will continue before dipping. A number of tests in both territories have penetrated much farther into the horizon than was expected by early performances, thereby improving the prospects of the two sectors.

Indian Territory Illuminating Oil Company's No. 1, SWc Section 1-11-3w, was the north extension well and carried production one-quarter of a mile. This also brings the play along the north line into the small townsite subdivisions. It is producing from 29 feet in the Detrital sand at 6460 feet. The first 12 hours its production was 4944 barrels. It has a gas measurement of 11,800,000 barrels.

The south extension completion was the Sinclair Oil & Gas Company's Venal 2, NE NW SE Section 31-11-2w, nearly one-half mile ahead of production. Only a 45-minute gauge had been taken when this is written. It made 145 barrels during this time. The top of the Detrital horizon was 6330 feet, with broken sand from 6385-6526 feet. The thickness of the horizon is a very important feature of its performance.

### Number of Other Completions

The week was one of the most active experienced by the Oklahoma City field, with every day bringing at least one completion and running as high as four in one day.

The largest well was the Indian Territory Illuminating Oil Company, Cromwell-Franklin Oil Company's Lizzie Farley 2, SW NW NW Section 19-11-2w, on the east side of the field, but within the producing limits. This well made 1540 barrels the first hour, 1503 barrels the second, 1853 barrels the third hour, and 1935 barrels the fourth hour. Later it was continuing to hold its flow, making 5808 barrels in five hours three days later. It is producing from the Arbuckle limestone at 6009-6465 feet.

One of the original south extension wells, Sinclair Oil & Gas Company's School Land 1, NEc Section 36-11-3w, is being deepened. It had sand from 6394-6420 feet and is drilling ahead at 6437 feet in sandy lime, where it made 1520 barrels in 13 hours. Later it had been deepened to 6441 feet in sandy lime and was making 2550 barrels in 24 hours.

Indian Territory Illuminating Oil Company continues to work on its P. Trosper 1, NWc Section 18-11-2w, but is having little success making a good producer out of it. It made 54 barrels from the Arbuckle limestone topped at 6115 feet in which the bit is making hole at 6478 feet. This well appears to be located near the fault that is being found running in a northwest by southeast direction across the east edge of the pool.

Shell Petroleum Corporation has plugged back two of its Petty lease disappointments and has made gasoline producers out of them in the Detrital horizon. Its Petty 2, SWc NE Section 30-11-3w, first real disappointment in the Oklahoma City field, has been plugged back from 6746 feet to a new total depth of 6298 feet. The well log shows sand from 6178-6230 feet. After setting 4¾-inch casing at 6166 feet it made 260 barrels of gasoline in 22 hours and 35 minutes, with 56 million feet of gas. The gasoline is 66 degrees at a temperature of 50. The same company's Petty 5, NW SW NE Section 30-11-3w, now has a total depth of 6215 feet, after plugging back, in the Detrital sand topped at 6157 feet. It made 510 barrels of gasoline.

In the northern area of the field, Indian Territory Illuminating Oil Company's Theimer 2, NW SW NE Section 12-11-3w, has made one small flow while bailing rotary mud. It has the Detrital sand at 6320-30 feet, with the Arbuckle lime from 6341-60 feet. Another well in this area is the Wirt Franklin Petroleum Corporation's Lowery 7, CEL NW Section 12-11-3w, which made 1160 barrels the first hour and 968 barrels the second hour. Indian Territory Illuminating Oil Company's Theimer 1, SW NE Section 12-11-3w, another important north region test, produced 4558 barrels of oil in five hours and was then shut in. It is cutting one per cent.

The most important completion along the west side of the field was the Indian Territory Illuminating Oil Company's Unsell-Krager 2, NW NE NE Section 23-11-3w, which is showing good, and has gushed over the top of the crown block.

Production of the field continues to vary greatly as the proration of wells is changed daily, according to the capacity of tanks and pipe lines. One day last week it was 67,971 barrels from 24 wells, with 108 wells shut in. The next day it was but 34,474 barrels from 18 open wells with 115 wells shut in.

Of importance in this connection is that two new pipe lines may enter the field. The Texas Pipe Line Company of Oklahoma has finished a survey and is now studying its estimates of costs. The Tidal Pipe Line Company is also understood to be planning on entering the field.

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Tulsa.—Kelly, Dempsey and Company, pipe line contractors with headquarters in Tulsa, have started work on a new 24-inch and 20-inch pipe line of the Cities Service Gas Company from the Oklahoma City field to the company's main line system at Orlando, a distance of approximately 50 miles. This is one of the largest jobs of solid welding that has been done in the Mid-Continent field.

The complete job is being handled by Kelly, Dempsey and Company and the work is expected to be completed within 60 days.

Kelly, Dempsey and Company completed last year for the Cities Service Gas Company a solid welded line from Ottawa, Kansas, to Topeka, Kansas, of 20-inch pipe and service on that line has been uninterrupted.

# McPherson County Most Active Area in Kansas

WICHITA.—The Ritz field of McPherson County was extended the past week by the McPherson Oil & Gas Company's Koehn 1, C SE Section 12-20-2w. This well had the chat at 2932 feet, with the first oil at 2980 feet. Its total depth is 2974½ feet. The first 20 minutes it made 75 barrels, the next hour 81 barrels, and 66 and 71 barrels, respectively, the next two hours.

McPherson County was by far the most active spot in Kansas as a result of this completion and the several completions in the Voshel pool. The latter pool was extended south and several locations to the north and west, however, several of the north and west direction completions are not looking overly bright.

The south extension well is the Shell Petroleum Corporation's Stuckey 3, SW SE SE Section 9-21-3w, which has 2000 feet of oil in the hole from the Wilcox sand at 3363-70 feet and is behaving similar to many of the completions in the area. Shell Petroleum Corporation completed two additional wells on this acreage the past week, both being one location north of No. 3. Number 1, NE SE SE Section 9-21-3w, was deepened from its old total depth of 3368 feet in the Wilcox sand to 3370 feet where it swabbed 1097 barrels the first 19 hours. Number 2, NW SE SE Section 9-21-3w, had the Wilcox sand at 3342-3350 feet and swabbed 242 barrels in the first 14 hours and 30 minutes.

Gypsy Oil Company's Katie 1, SE SW Section 4-21-3w, to the northwest, carried production in that direction. It swabbed 557 barrels of oil from the Wilcox sand at 3458-68 feet. It has 1200 feet of water in the hole, which it was carrying, but it looks like a small well.

Immediately south of this well, Indian Territory Illuminating Oil Company's Voshel 1, C NE NE NW Section 9-21-3w, had the Viola lime at 3303 feet, sandy lime at 3360-64 feet, total depth. There were 1000 feet of fluid in the hole. One-fourth of a bailer of water was recovered from the bottom of the hole. It swabbed 140 barrels in 12 hours.

Continuing on south, the Dixie Oil Company and Amerada Petroleum Corporation's Voshel 1, NEc SE NW Section 9-21-3w, along the west edge of the pool, topped the Wilcox sand at 3502 feet, which formation it penetrated to a total depth of 3554 feet, where it had 500 feet of oil in the hole from 3550-54 feet. It swabbed 35 barrels of oil, with water rising 200 feet in the hole.

On the northeast edge of the Wilcox sand producing area at Voshel, Gypsy Oil Company's Krehbiel 1, SWc Section 3-21-3w, swabbed 1020 barrels the first 24 hours from the Wilcox sand at 3424-28 feet. It is the farthest northeast Wilcox sand producer.

To the southeast, E. W. Marland et al's Krehbiel 1, SWc NW Section 3-21-3w, had the chat at 3009-26 feet, and is drilling ahead.

Northwest of the field, Independent Oil & Gas Company et al's semi-wildcat test in the CEL E½ Section 5-21-3w, is running very low. It is drilling at 3245 feet in shale and has not reached the chat yet. Also in McPherson County, Kansan Oil Company's test in the SW NW Section 21-20-1w, had the Viola lime at 3444 feet and at 3485 feet had a hole full of water. The Wilcox sand was reached at 3496 feet and at 3555 feet it is drilling.

The Shell Petroleum Corporation's Southwestern College 1, SE SW Section 2-27-1w, new discovery well near Wichita, Sedgwick County, made 197 barrels of oil and 580 barrels of water during a recent 15-hour gauge.

Dixie Oil Company and Amerada Petroleum Corporation's Foulston 1, SW SW NW Section 11-26-2e, Sedgwick County, is dry and abandoned with a hole full of water in the Siliceous lime at 3333-36 feet.

In the Schurr pool of Rice County, Producers & Refiners' Thompson 1, SE SE NW Section 21-20-10w, made 442 barrels the first 18 hours on the pump. It is one of the four wells in the field and is producing from the Siliceous lime at 3329-31 feet.

# Konawa Developments Leave Much Yet to Learn About Pool

TULSA.—With several extensions and several failures found in the Konawa pool, southern Seminole County, Oklahoma, during the past week, this area was closely watched by operators. While much additional information was gleaned from the various completions, there is still much to learn about this new pool, however, indications are that the south direction will be the best producing area and the widest scope.

Most important among the completions at Konawa was the Hilton Phillips' Hyde 1, SEc NE Section 20-6-6, one and one-half miles south of production. This well flowed 1050 barrels in 17 hours and later made 335 barrels in six and one-half hours after which it was shut in for proration. The sand record of the well was slightly lower than found in the regular part of the pool, but the hole was found to be off vertical. Some say it is 150 feet off vertical at 3000 feet, which would make its sand depth about on a level with the pool proper, while others say it is but 102 feet off, which leaves it slightly lower. As a result of this well a number of new locations were made in the south end of the pool.

Along the south end of the field, The Texas Company's Harjoche 1, NE NW NW Section 17-7-7, was completed for 1900 barrels in the Cromwell sand at 29-15-38 feet. It is slightly west and a little south of the field proper, but within the limits proven by the Hilton Phillips well.

These wells make the south end of the pool look very good, and gives it a length in this direction of approximately two miles, with most of the locations to be drilled.

### Failures in North End

The north end of the Konawa pool is apparently being found. Last week, in addition to the previously completed small wells, the Empire Gas & Fuel Company and Champlin Refining Company's Rogers 1, SWc NW Section 9-6-6, one-quarter mile north of the discovery well, encountered 1500 feet of salt water in the Cromwell sand at 2924-39 feet.

Previously, Mid-Continent Petroleum Corporation's semi-wildcat test in the SEc NW Section 6-6-6, one and three-quarter miles northeast of the pool, had found a hole full of water at 3223 feet and is drilling ahead.

Of interest is the Twin State Oil Company test in the NE SE SW Section 8-6-6, on the west side of the pool. This test had nothing in the Cromwell sand, missed the Hunton lime entirely and penetrated the top of the Viola lime at 3850 feet, and is drilling below 3930 feet. It looks as if it had a favorable chance of finding Wilcox sand production, depending on the thickness of the formation yet to be drilled.

Along the south edge of the pool, but removed toward the east side of that trend, Independent Oil & Gas Company's Okfuskee 1, NW SW NW Section 16-6-6, is being plugged back after swabbing only 97 barrels of accumulated oil at 3195 feet.

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Tulsa.—In the old Cushing field of Oklahoma, Mul-Berry Oil Company's Sharum 5, NE NW NW Section 5-17-4e, has been deepened to make a good producer. This well was completed about three years ago for 110 barrels at a total depth of 4247 feet. At the time it was deepened it was making 15 to 20 barrels per day. It has been deepened to 4302 feet, with the producing horizon from 4295-4302 feet. The first 24 hours it made 1000 barrels and 950 barrels the second 24 hours.

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Tulsa.—The longest string of six-inch pipe ever run in a test in the state of Oklahoma has been cemented and is resting at 7566½ feet in the Sinclair Oil & Gas Company's Howell 1, C SW SW Section 14-26-24w, rank wildcat of Harper County, Western Oklahoma. This test has also become the deepest drilling hole in the state at this time.

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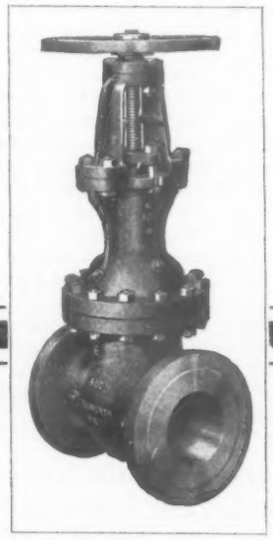

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HOUSTON — SAN ANTONIO — BEAUMONT — SHREVEPORT

# North and West Texas Field Notes

H. H. KING, *Staff Representative, Fort Worth, Texas*

# Judkins Field to Be Active; No Curtailment in Prospect

SAN ANGELO.—Leadership on drilling and new production is now assured for the Judkins field. Ector County, during the next few months over all single areas in the West Texas district. The trend of play is to the north of established production.

Transportation facilities are already assured for the accommodation of a large volume of daily output, while the location of the field in respect to railroad and highway facilities is more favorable than any previous major strike in the district. Independent refiners and purcharers have been attracted by the expected flush output, and a firm market now prevails on crude at the posted price.

Actual production from five flowing wells was averaging 3500 barrels daily this week, with restrictions temporarily placed on the two largest producers.

Encountering of sulphur water by Llano Oil Company's T. S. Hogan 1, located one mile southeast of production in the Judkins field, will result in development work on the south end of the structure being confined to both sides of the east line of the row of University sections for the time being. This failure encountered water at 3838-43 feet, or at the expected oil horizon, after drilling 489 feet below the top of the brown lime and 353 feet below the top of the while lime horizon. A free ride was obtained by Llano Oil Company in the drilling of this test through the donation of acreage further south to Penn Oil Company, which drilled the hole as part consideration. Llano Oil Company proposes to start work shortly in drilling one or more tests on its lease located south of the railroad and in the north one-half of Section 6, as Independent Oil & Gas Company and Tidal Oil Company's Eidson 1 creates a direct offset to cover. It is reported that Geo. McCamey et al have obtained lease from Ector County on a strip of abandoned highway along the south line of the railroad in Section 6, and will drill on same.

### No Curtailment of Judkins

Eight companies and partnerships were drilling on 16 tests and rigging up on seven additional locations in the Judkins field early this week. Completions from this activity will begin late next week, with the assurance of a continuous quota thereafter. Curtailment of drilling and production is being given no consideration by these operators, and all are making preparations to see the campaign through with market outlets. Supply houses and lumber yards are locating in the district to demand a share of the big volume of business that has been breaking lately, although the former are generally picking Odessa for their locations, as it is also the gateway to Andrews County, which has prospects of being the next boom area for the district.

Lease owners in the Pecos Valley pool, Pecos County, are reviving drilling activities as result of the recent completion of a 300-barrel producer from M. H. Black and Dittman Drilling Company's Pecos Valley Fee 1 at 1533 feet. Machines were ordered shipped into this field by Southern Crude Oil Purchasing Company, Independent Oil & Gas Company, The California Company, O. J. Perren et al and Messenger et al. Activity is also slated to pick up in vicinity of the 25-barrel flowing wildcat oil production of Cranfill-Reynolds Company on the Masterson land, located to the southeast and on a line towards the Taylor-Link field. Atlantic Oil Producing Company's Shearer 1, an offset to the Masterson producer, began flowing by heads late last week after encountering lime at 1438-45 feet. This new producer started off flowing 20-barrel heads at five-hour intervals. The oil tests 30 gravity at 68°. Atlantic Pipe Line Company is serving producers in southwestern Ward County, and may extend across the river into this area should production later justify. Phillips Petroleum Company is starting a test on the Shearer ranch in Section 99. Cranfill-Reynolds et al's Masterson 1-B, located in Section 105 and one mile south of the discovery well, missed the shallow oil horizon, and at last reports was drilling in sulphur water below 1700 feet.

### Deep Hole is Straight

An almost perfectly straight hole is revealed by an acid bottle test given recently on the Big Lake Oil Company's University 3-C, which is trying to drill ahead in shale and calcite at 8540 feet with a loaded hole to drown oil and gas production. This test is the deepest drilled outside of California and did not vary from perpendicular down to the 7500-foot level. An acid bottle test reveals a variation of one and one-half degrees at 8300 feet and two and three-quarter degrees from perpendicular at the 8500-foot level. Cable tools were used throughout, but rotary may be necessary to negotiate the exceedingly hard formation now retarding progress of the hole.

## Northern Wichita County Deep Test Located

Wichita Falls, Texas.—Drilling is scheduled to be started within 90 days by Deep Oil Development Company on a 6000-foot project in the Hirschi field, located in Northern Wichita County. This company was formed last October by a large group of operators and business men in the North Texas district to drill a number of deep tests at scattered points, and it is reported that about $750,000 has been raised for such purpose. The deep test for the Hirscsi field has been tentatively located in the southeast corner of the Tucker and Langford 160-acre tract, David Cowan Survey, Abstract 43, and about one mile from Howell and Sommers' Hirchsi 1, which was abandoned last March at 5283 feet. The latter is the deepest test in Wichita County. Deep Oil Development Company has also made a tentative location in Section 82, Kemp's Wichita Valley Land Survey in Southern Wichita County.

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Mexia, Texas.—Tankage facilities in the Mexia-Corsicana district are credited with a gross capacity of 23,083,500 barrels, with approximately 10,478,900 barrels of mixed grades of crude in storage at the close of January, 1930. This district has been used as a crude concentration point by major pipe line companies for a number of years on oil destined for Gulf Coast delivery. Oklahoma, Panhandle, West Texas and Ranger crudes are included in the grades of oil held in the district.

# New Mexico Expecting Profit From Texas Pipe Line Law

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Wildcat activities centering on Van Zandt and nearby counties failed to contribute developments of any consequence during the past week, although a number are approaching a decisive depth for production in the Woodbine horizon.

# North and West Texas Field Notes

H. H. KING, *Staff Representative, Fort Worth, Texas*

# Judkins Field to Be Active; No Curtailment in Prospect

SAN ANGELO.—Leadership on drilling and new production is now assured for the Judkins field. Ector County, during the next few months over all single areas in the West Texas district. The trend of play is to the north of established production.

Transportation facilities are already assured for the accommodation of a large volume of daily output, while the location of the field in respect to railroad and highway facilities is more favorable than any previous major strike in the district. Independent refiners and purcharers have been attracted by the expected flush output, and a firm market now prevails on crude at the posted price.

Actual production from five flowing wells was averaging 3500 barrels daily this week, with restrictions temporarily placed on the two largest producers.

Encountering of sulphur water by Llano Oil Company's T. S. Hogan 1, located one mile southeast of production in the Judkins field, will result in development work on the south end of the structure being confined to both sides of the east line of the row of University sections for the time being. This failure encountered water at 3838-43 feet, or at the expected oil horizon, after drilling 489 feet below the top of the brown lime and 353 feet below the top of the while lime horizon. A free ride was obtained by Llano Oil Company in the drilling of this test through the donation of acreage further south to Penn Oil Company, which drilled the hole as part consideration. Llano Oil Company proposes to start work shortly in drilling one or more tests on its lease located south of the railroad and in the north one-half of Section 6, as Independent Oil & Gas Company and Tidal Oil Company's Eidson 1 creates a direct offset to cover. It is reported that Geo. McCamey et al have obtained lease from Ector County on a strip of abandoned highway along the south line of the railroad in Section 6, and will drill on same.

### No Curtailment of Judkins

Eight companies and partnerships were drilling on 16 tests and rigging up on seven additional locations in the Judkins field early this week. Completions from this activity will begin late next week, with the assurance of a continuous quota thereafter. Curtailment of drilling and production is being given no consideration by these operators, and all are making preparations to see the campaign through with market outlets. Supply houses and lumber yards are locating in the district to demand a share of the big volume of business that has been breaking lately, although the former are generally picking Odessa for their locations, as it is also the gateway to Andrews County, which has prospects of being the next boom area for the district.

Lease owners in the Pecos Valley pool, Pecos County, are reviving drilling activities as result of the recent completion of a 300-barrel producer from M. H. Black and Dittman Drilling Company's Pecos Valley Fee 1 at 1533 feet. Machines were ordered shipped into this field by Southern Crude Oil Purchasing Company, Independent Oil & Gas Company, The California Company, O. J. Perren et al and Messenger et al. Activity is also slated to pick up in vicinity of the 25-barrel flowing wildcat oil production of Cranfill-Reynolds Company on the Masterson land, located to the southeast and on a line towards the Taylor-Link field. Atlantic Oil Producing Company's Shearer 1, an offset to the Masterson producer, began flowing by heads late last week after encountering lime at 1438-45 feet. This new producer started off flowing 20-barrel heads at five-hour intervals. The oil tests 30 gravity at 68°. Atlantic Pipe Line Company is serving producers in southwestern Ward County, and may extend across the river into this area should production later justify. Phillips Petroleum Company is starting a test on the Shearer ranch in Section 99. Cranfill-Reynolds et al's Masterson 1-B, located in Section 105 and one mile south of the discovery well, missed the shallow oil horizon, and at last reports was drilling in sulphur water below 1700 feet.

### Deep Hole is Straight

An almost perfectly straight hole is revealed by an acid bottle test given recently on the Big Lake Oil Company's University 3-C, which is trying to drill ahead in shale and calcite at 8540 feet with a loaded hole to drown oil and gas production. This test is the deepest drilled outside of California and did not vary from perpendicular down to the 7500-foot level. An acid bottle test reveals a variation of one and one-half degrees at 8300 feet and two and three-quarter degrees from perpendicular at the 8500-foot level. Cable tools were used throughout, but rotary may be necessary to negotiate the exceedingly hard formation now retarding progress of the hole.

## Northern Wichita County Deep Test Located

Wichita Falls, Texas. — Drilling is scheduled to be started within 90 days by Deep Oil Development Company on a 6000-foot project in the Hirschi field, located in Northern Wichita County. This company was formed last October by a large group of operators and business men in the North Texas district to drill a number of deep tests at scattered points, and it is reported that about $750,000 has been raised for such purpose. The deep test for the Hirscsi field has been tentatively located in the southeast corner of the Tucker and Langford 160-acre tract, David Cowan Survey, Abstract 43, and about one mile from Howell and Sommers' Hirchsi 1, which was abandoned last March at 5283 feet. The latter is the deepest test in Wichita County. Deep Oil Development Company has also made a tentative location in Section 82, Kemp's Wichita Valley Land Survey in Southern Wichita County.

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held to 50 barrels per hour Monday. It is a north offset to a smaller producer completed several weeks ago by The Texas Company's Coombs-Worley 6 at nearly 100 feet greater depth, while Gulf Production Company's southwest diagonal offset to the new producer swabbed 1360 barrels initial at 2928 feet.

New locations were made during the past week about one mile further north of the above wells as result of the Wilcox Oil & Gas Company's Coombs-Worley 10 being replaced on production after being shut in since Christmas eve. This well made only 1350 barrels during the first 24-hour gauge owing to paraffin accumulation, but when cleaned out jumped its flow to an average of 2600 barrels daily during the following three days, with about 10 million cubic feet of gas in evidence. It is producing from granite wash at 2811-20 feet. Opening of this well resulted in Sun Oil Company starting a test in the SWc SE Section 35, with Wilcox's Coombs-Worley 12 as a west effset. Gulf Production Company is rigging up for a test in the southeast corner of Section 38, and will be offseted by Wilcox's Coombs-Worley 11. These four will all require south offsets.

## Corrosion Test at Dallas

Dallas, Texas.—More than three score representatives of oil and gas pipe line companies, pipe manufacturers and paint companies assembled here March 4 to get first hand information on soil corrosion sustained by a varied assortment of pipe buried about eight years ago by the National Bureau of Standards in connection with an exhaustive study on pipe corrosion now under way. Kirk H. Logan, electrical engineer for the bureau, supervised the excavation of the pipe joints, which will be forwarded to headquarters at Washington, D. C.

These pipe joints were buried in an alley within the city of Dallas by the Bureau of Standards as part of a nationwide test on soil corrosion. The samples of pipe included some of the following grades: steel, wrought iron, sand cast iron, centrifugal cast iron, duriron, brass and copper. Each article was stamped for identification purposes. During the eight years ground corrosion attacked some of the pipe noticeably, while others were unscathed. Those present were permitted to inspect the joints as they were unearthed, but the detailed analysis of the damage and loss in weight by the joints will not be made public until the data on all tests are compiled by the bureau. G. W. Martin of the Dallas Gas Company furnished a crew of workmen to excavate the test joints, and prepare same for shipment to Washington.

Prior to coming to Dallas, Logan had recovered a batch of pipe from a test pit near New Orleans, and planned to visit San Antonio March 5 on a similar mission before going to California, where several tests were made.

# Spring Meeting of Division of Production at Midland

MIDLAND, Texas.—Preliminary announcement is made of the spring meeting of the American Petroleum Institute, Division of Production to be held at Midland, Texas, April 10, at the Scharbauer hotel. All members of the former Division of Development and Production Engineering, who have already received communication from the American Petroleum Institute concerning the reorganization of the Institute into three divisions, have also been informed of the merging of the former division into the division of production, and the activities of the former division will now be directed by the central committee on drilling and production practice under the chairmanship of T. E. Swigart.

The tentative program follows:

Methods of Proration in Texas Fields, by L. E. Barrows, Division Manager, North Central Texas Division, Producing Department, The Texas Company. This paper will summarize the methods employed in prorating production in the various Texas fields.

Air and Gas Injection Problems, by V. Foran, Petroleum Engineer, Fain-McGaha Oil Company, Wichita Falls. This paper will deal with factors limiting progress in development of air and gas injection practice. Recent experience in this method for producing petroleum has indicated the need for further development in the apparatus used, to broaden the scope and applicattion of the air and gas injection method. This paper will be discussed from the manufacturer's viewpoint by John Rogers of Ingersoll-Rand Company and others.

Report of Special Committee on a Standard Electric Power Rate Structure, by E. C. Allen, General Superintendent, Shell Petroleum Corporation, Dallas. The function of this committee is to create a better understanding of electric power costs by simplifying present power rate structure and methods of invoicing power consumption. This subject is of wide interest to all producers in the Southwestern area. Several methods are in use for invoicing power which are not readily understood by the non-technical operator and accountant.

Organization and Purpose of A. P. I. Field Chapters, by J. R. McWilliams, Chief Engineer, Skelly Oil Company, Tulsa. Mr. McWilliams will describe the methods of organizing A. P. I. field chapters and the results accomplished in other districts. These field chapters provide a forum in the individual fields where operators can get together and discuss problems of mutual interest and benefit. Some of the chapters in other districts are meeting monthly and are reporting an ever increasing attendance for the reason that the results obtained are well worth the effort expended .

An informal symposium will be held for the discussion of any question or problem that may be presented from any one in attendance. These questions should be prepared in writing and submitted to the secretary preferably in advance of the meeting. They should be addressed to E. V. Foran, secretary, Southwestern District, A. P. I. Division of Production, care Fain-McGaha Oil Company, Wichita Falls, Texas.

The following committee reports will be sumbitted for discussion:

Drilling practice by Melbert Schwarz, chairman. Production practice by W. W. Scott, chairman.

In accordance with usual practice and as provided in the supplemental plans for the Division of Production, the officers for the Southwestern District for 1930 will be nominated and elected at this meeting.

A dinner at 6:30 p. m., will be served in the main ballroom of the Scharbauer Hotel, which will conclude the meeting. The meeting has been so scheduled that those who desire to leave on the 10 o'clock Eastbound train may do so.

As will be noted from the foregoing, the program provides for a one day session; however, members of the division residing in Midland, C. W. Alcorn, chairman (care Shell Petroleum Corporation), wish to advise that free trips to any field in the vicinity of Midland have been arranged. This will provide an opportunity to visit the various fields, such as Yates, Wink and Big Lake.

## National Oil Scouts Meet At San Antonio in May

Fort Worth, Texas.—The seventh annual convention of the National Oil Scouts Association of America will be held in San Antonio on May 19 and 20. A number of cities made bids for this two-day gathering of oil scouts, and the invitation submitted by San Antonio won the majority vote of the board of directors and executive officers during a special meeting here March 8. Ford Turner, scout for Pure Oil Company, San Angelo, and president of the association, presided at the meeting. L. S. McGee of San Antonio was designated by Turner as chairman of convention arrangements, and the former will be assisted by a committee of scouts and oil operators residing in San Antonio.

# Gulf Coast Field Developments

JACK LOGAN, *Staff Representative, Houston, Texas*

# Second Oil Producer at Pettus Starts More Tests Drilling

HOUSTON.—The second oil producing well of the Pettus field, Bee-Goliad Counties, was completed late last week. It is Union Producing Company's Ray 5, a direct north offset to Humble Oil & Refining Company's McKinney 1, discovery oil well of the area.

Total depth of Union Producing Company's well is 3966 feet. The oil sand was topped at 3952 feet, and 8 1-4 inch casing was cemented just above the sand. After 18 feet of six-inch screen had been set on bottom, the well came in flowing 79 barrels of 45 gravity pipe line oil per hour through a 9-32-inch choke, showing pressure of 425 pounds. A later report showed the well flowing 2000 barrels daily through a 5/16-inch choke.

This new producer is now shut in because of lack of storage or pipe line outlet.

Humble Oil & Refining Company's McKinney 1, the Pettus discovery well, came in February 1, 1930, and during the first 24 hours flowed 524 barrels 45 gravity pipe line oil through a 5-16-inch choke, with one joint of screen in the producing sand, which was logged at 3957-71 feet. The difference between the depths at which production was found in the two producing wells is accounted for partially by a difference in surface elevation. That of Humble Oil & Refining Company's well is 387 feet, while the elevation of Union Producing Company's new well is 378 feet.

Humble Oil & Refining Company last week began shipping crude from Pettus by tank car to its refinery at Baytown, having laid a small pipe line from the field to the town of Pettus, a distance of 1 1-2 miles. Pettus is on the San Antonio & Aransas Pass (Southern Pacific) railroad. Humble Pipe Line Company has started construction of a new eight-inch pipe line from Refugio field to its tidewater terminal at Harbor Island and to Humble Oil & Refining Company's refinery at Ingleside in the same vicinity on the Gulf Coast, near Port Aransas, and in the event of development of a major field at Pettus, the line that is now being built may be extended northward from Refugio to Pettus. The latter is almost due north of Refugio, and the distance between the fields is approximately 35 miles.

Union Producing Company is a subsidiary of United Gas Company (Moody-Seagraves interest), and like Humble Oil & Refining Company, holds extensive acreage in the Pettus district. No provision has yet been made for handling production of the Moody-Seagraves interests at Pettus. However, in the event of the development of sufficient production, they too will be advantageously situated for extension of a line from Refugio. Moody-Seagraves interests recently acquired ownership of the Gulf Coast Pipe Line Company, which has a double-line, consisting of six-inch and eight-inch pipe, from Refugio to tanker loading terminal at Port Aransas, 32 miles away, with a booster station midway on the lines.

### Possible Large Area

Present indications point to the possibility of an extensive producing area at Pettus—one comparable, perhaps, to the Raccoon Bend field, Austin County, which is now more than two miles wide and four miles long.

At any rate, a large gas well, Zoch et al's Kaufman 1, was completed about Christmas, 1929, at a point approximately six miles northeast of the two Pettus oil wells, indicating that the trend of production will be in that direction and possibly extend that far or farther. The Zoch well is located in the Pedro Trevino Survey, in the northwest corner of Goliad County. It logged the producing sand at 4214-30 feet, and came in as a 40 million foot dry gas well.

Previous to completion of the Zoch well, development at Pettus had assum a northeastward trend, and encouraging information was obtained through the drilling of Mission Drilling Company's (United Gas Company) Ray 3. That well was located in the west edge of Goliad County, about two miles east and a little north of the present two oil wells. Through drill stem test in August, 1929, it made one head of gas and 44.7 gravity oil from 4052-62 feet, but failed to make a producer when casing and screen were set. The well was then deepened, tested salt water and gas at 4266-73 feet, reached total depth of 6005 feet in shale, and was plugged back to 4060 feet, where it was completed as a gas well.

Prior to the discovery of oil at Pettus, the Moody-Seagraves interests, through the subsidiary, Mission Drilling Company, had completed three gas wells, on the Ray ranch, Ray 1, the discovery gas well of the field, finished late in 1928, and Ray 2 and Ray 4. Those three gas wells are rather close together, and are approximately one mile due north of the two oil producers.

A short time before bringing in Ray 5 as an oil well, Union Producing Company abandoned Ray 6 at 5082 feet. It is only about 800 feet south and a little east of Ray 2.

### New Tests Starting

Various new tests are now drilling in a wide radius from the oil wells at Pettus, and several new locations were made during the past week.

Humble Oil & Refining Company has made location for McKinney 2 in the L. C. Randolph Survey, 600 feet due south of the discovery well, and Union Producing Company has offset the discovery well on the west with Ray 7.

In Goliad County Humble Oil & Refining Company is rigging up on Lackey & Weldon 1. That test is located 3½ miles northeast of the discovery oil well of the Pettus field, and about midway on an almost direct line between the discovery oil well and the above mentioned gas well of Zoch et al. It is approximately 1½ miles northeast of Mission Drilling Company's Ray 3, which was discussed above.

Still farther to the northeast William F. Morgan et al are drilling at 2680 feet in Ray 1, which is located about one mile from the Zoch well. Morgan's present test is also in Goliad County.

Houston Oil Company on March 11 was drilling gumbo and lime at 2250 feet in Portis 1, which is located 1½ miles southwest of the Pettus discovery oil well and one-third mile south of the town of Pettus. That test is 200 feet out of the northeast corner of the A. Smalley Survey, Bee County.

William F. Morgan is drilling two

wells in the Bee County portion of the field; Ray 1 is drilling shale at 3617 feet, and R. A. McKinney 1, located near the Bee-Karnes County line, is drilling at 800 feet.

While most of the activity in the Pettus area is in a general trend northeast and southwest of the oil wells, The Texas Company is now drilling a deep test almost directly northwest of the oil wells. That test is Tipps 3, located approximately seven miles northwest of the discovery oil well. It is in Block 44, C. Clark Survey, Bee County, 150 feet from the east and 450 feet from the south line of the block. The Texas Company has been interested in that area for several months, and had drilled several shallow wells in the area before oil was discovered at Pettus. During the past week The Texas Company also rigged up on another test in the same area, Suffel 1, and has started drilling.

Grayburg Oil Company has entered the Pettus district, and has set 10-inch casing at 300 feet in its first test of the area, A. J. Kimbell 1.

## Refugio

Houston.—The outstanding news of the past week concerning development of the Refugio field was the announcement by Humble Pipe Line Company on March 10 that it would immediately begin construction of an eight-inch pipe line between Refugio and Humble Oil & Refining Company's Ingleside refinery. Aside from supplying crude to the refinery, Humble Pipe Line Company expects to make shipments of unrefined oils from Harbor Island, near the refinery, where it has facilities for loading deep draft vessels. The Harbor Island loading docks were built primarily for handling West Texas oils.

Total length of the new line from Refugio to the coast will be 28 miles. Work is being rushed to completion on the line, and it is expected to be in operation between April 15 and April 20.

While present plans call only for building the line from the coast to Refugio, it is likely to be projected on to the Pettus field, Bee-Goliad Counties, in the event of the development of a major producing area there. Humble Oil & Refining Company already has one producing oil well there, the discovery well of the field, and during the past week the second oil well of the area was completed, Union Producing Company's Ray 5. Aside from the large lease on which the discovery well was drilled, Humble Oil & Refining Company has extensive other acreage in the Pettus district.

Although a large number of wells are drilling at Refugio, 45 rigs being in operation in the field, there were only a few completions during the past week.

Union Producing Company has abandoned O'Brien 2, one of the tests of the east side trying for production in the so-called "O'Brien sand." It had been drilled to total depth of 5558 feet, set 4½-inch casing and tested salt water at 5554-68 feet. The same company completed J. F. B. Heard 2 for 500 barrels initial production at 3668 feet.

## Raccoon Bend Extended to Brazos River

Houston.—Oil production in the Raccoon Bend field, Austin County, has been extended approximately 4000 feet eastward, through completion by Humble Oil & Refining Company and Valley Oil Corporation of their Duncan State 1 in the Brazos River bed. From total depth of 3291 feet it flowed 279 barrels of pipe line oil during the first 24 hours.

The most easterly producer of the field formerly was Humble Oil & Refining Company's and Valley Oil Corporation's Paine 4. The extension well is almost due east of it.

From the standpoint of productive area, Raccoon Bend is now one of the largest fields of South Texas. Although it is ordinarily regarded as a Gulf Coast field, Raccoon Bend is farther inland than most of the salt dome fields, and no indications of a salt dome have been found there.

In the east-west direction, oil production at Raccoon Bend now extends a total distance of approximately 2½ miles, while in the north-south direction it extends almost two miles. Throughout that area the producing sands are found at about the same depth, around 3350 feet. In the south part of the field the production is around 22 gravity oil, while in the north part most of the production is around 32 gravity.

In addition to the oil sands, there is at Raccoon Bend a 1000-foot gas sand extending throughout the field and beyond present limits of oil production. That gas and sand has not been extended beyond the north and south limits of oil production, but in the east-west direction it has been proved up for 9000 feet beyond oil production, all that extension being to the west. Thus the 1000-foot gas sand is proved up over an area extending two miles from north to south and approximately four miles from east to west.

Another completion at Raccoon Bend during the past week was Humble Oil & Refining Company's and Valley Oil Corporation's Deutrich B-8, which came in as a 75-barrel well at 3256 feet.

Raccoon Bend is now producing around 12,000 barrels daily, with production partially pinched in. The field is being developed altogether by the two above named companies, which have leases covering the area.

## Brazoria County

Houston. — The Texas Company has completed rigging up on its wildcat test, O. F. Ewing 1, located 1½ miles north of the town of Manvel, northern Brazoria County. The location is 15 miles south of Houston. It is 150 feet from the northwest line and 150 feet from the southwest line of Lot 29, Block E, Allison Richey Subdivision, H. N. Little Survey.

Indications of a salt dome were found there in 1929 by torsion balance. The prospect is within a short distance of four producing fields. It is six miles south of Mykawa, nine miles south of Pierce Junction, nine miles southeast of Blue Ridge, and 12 miles east and a little south of Sugar Land. The present test of The Texas Company is the first to be drilled on the Manvel prospect.

## Harris County

Houston.—Humble Oil & Refining Company has abandoned its Woodburn 2 on the Genoa prospect, Harris County, at total depth of 5241 feet. That well was completed late in 1929 as a gas well with 700 pounds pressure when one joint of screen was set at 3410-25 feet, but it was then deepened in the hope of finding oil production. A drill stem test was made at 4130 feet but it showed salt water. Genoa is a torsion balance prospect, and the above well, located in the August Whitlock Survey, was the second to be drilled there.

## Moores

Houston. — Gulf Production Company has completed Moore 20 at Moores field, Fort Bend County, as a 2200-barrel flowing well. Total depth of the hole is 3980 feet. One joint of screen was set in the sand, which was topped at 3966 feet, and the well came in flowing 2200 barrels of 27.8 corrected gravity pipe line oil daily through a one-half-inch choke, registering pressure of 200 pounds. This well is on the south flank of the field in the James Frazier Survey. It is 300 feet south and 125 feet west of Moore 18, which came in about a year ago as an 800-barrel well at 3888-3902 feet.

Moores Field has the distinction of being the first field of the Gulf Coast found by seismograph, having been discovered the latter part of 1924, by Gulf Production Company. That company has leases covering the whole prospect. It has completed a total of six producing wells there out of the 20 that have been drilled. Moores Field is sometimes referred to as Orchard dome.

## Committee to Survey Industry Named

Washington. — Secretary Wilbur on March 10 appointed a committee of five men to make up a "complete and unprejudiced analysis of the status of petroleum demand" as a further step toward carrying out the administration's policy of oil conservation.

The committee which he, as chairman of the Federal Oil Conservation Board, named consists of J. Elmer Thomas of Fort Worth, chairman; Joseph E. Pogue, New York City, chairman, and Ray Collins of Tulsa, umpire of production in the Mid-Continent; H. P. Grim, umpire of production in California; and H. W. Lowrie, Jr., of Denver.

The study of the national situation to gain an outlook for 1930, is expected to hinge chiefly around two questions: anticipated consumption of refined products, and the amount of crude necessary to meet sufficiently that demand.

Houston. — Cranfill-Reynolds Company completed two wells during the past week at Esperson dome, Liberty County. Esperson 7-A came in flowing 700 barrels daily at 2292-96 feet. Davis 2 on the west edge of the field came in flowing 350 barrels of 21 gravity pipe line oil daily at 2304-20 feet.

This company controls a large percentage of the field. Its Moores Bluff Corporation 2 is a derrick, and Esperson 8-A is drilling gumbo at 1500 feet.

Yount-Lee Oil Company's Moores Bluff Corporation 2, which was drilled to 6600 feet, has been sidetracked and is drilling around 2500 feet in the sidetrack hole.

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Tulsa. — Taubman Supply Corporation with headquarters in Tulsa and branches and warehouse stocks in the field have been appointed distributors in the Mid-Continent, exclusive of the Gulf Coast area, for Chapman Valve Manufacturing Company's products. This includes Chapman brass, iron and steel gate valves for all drilling and production and pipe line purposes as well as standard and high pressure valves for refinery and natural gasoline plant operation.

James B. Ford, factory engineer of Chapman Valve Manufacturing Company, will continue to make his offices in Tulsa and will work in cooperation with the sales organization of the Taubman Supply Corporation in the capacity of consulting engineer.

According to Herman P. Taubman, president of Taubman Supply Corporation, the addition of the Chapman Valve line will round out his company's business in the oil and gas industry as the Taubman organization already is well known in pipe circles, having dealt in new and used pipe since its founding 10 years ago when Mr. Taubman came to Tulsa from Joplin, Missouri, to organize H. P. Taubman Supply Company. In 1925 Taubman Supply Corporation was incorporated under the laws of Oklahoma with a capitalization of $250,000. Today the company's pipe business alone amounts to some $4,000,000 annually.

Branches of Taubman Supply Corporation will continue to be maintained in Oklahoma City and Houston and a display room and warehouse will be maintained at 115 West First Street in Tulsa in addition to the company's general offices located in the Midco Building there. Taubman Supply Corporation also is Mid-Continent distributor for lapweld pipe of the Central Tube Company of Pittsburgh and in 1929 became distributor for seamless casing of the Pittsburgh Steel Products Company.

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Beaumont, Texas. — Coastwise water shipments of Sun Oil Company from crude oil terminals at Sun and Sabine Pass on the Beaumont-Port Arthur ship channel amounted to 569,890 barrels during February, 1930.

# Mud Is South Texas' Impediment To Line Construction

WE hear a lot in these modern days about progress and the things that retard it, and just about everybody has his personal ideas as to the most imposing impediments to progress. But you will not find much diversity of opinion on the subject among a certain construction crew of the Houston Pipe Line Company, which has just finished building a natural gas line across parts of Wharton and Fort Bend Counties, Texas, from Boling dome to Long Point dome. The arch-impediment, they will readily agree, is MUD.

For this crew, under the direction of Construction Foreman Joe Worth and P. J. Manning, has had a winter-long fight with mud and water, building a 13-mile stretch of 12¾-inch line, with many days of freezing weather increasing the discomfort and difficulties that were already supplied in heart-trying degree by a season of excessive rainfall.

Plowing through mud often more than knee-deep, however, and swimming and scrambling about in water often over their heads, this hard-muscled and big-boned aggregation of pipe line builders has finally completed the muddy job. By reason of the mud and adverse weather it required four months to do the work which could have been done in two weeks under favorable conditions.

"It was a terrible job," declared Frank W. Kirk, general manager of Houston Pipe Line Company, as completion of the line was announced. "From the very beginning these men have had to fight mud that seemed without any bottom, and most of us in this region know what Wharton County can supply in the way of mud. It was slow going. They were forced in digging trenches for this line to throw up levees on each side of the line, to pump water out of the trench with hand pumps, and then to tediously move in the pipe, joint by joint. It was nearly always necessary to use four mules in the handling of a single joint of pipe.

"These men worked faithfully on as difficult a job as I have seen in a life-long experience of pipe line work. Pipe was often under water and buried in mud. As they grappled through the slime these men felt that every time they could get their hands on a piece of pipe they were doing something smart. Much of our equipment, tractors, caterpillars, trenching machines, were most of the time bogged in the mire, and often nearly out of sight entirely.

"The most difficult part of this work was east of the Bernard River, which is about 10 miles of it. For weeks the men were unable to get on the right-of-way. Even when they could, the ground was water-soaked, and almost every foot of it was a virtual swamp."

This new line was constructed to supply fuel for the new sulphur mining plant of the Texas Gulf Sulphur Company at Long Point, which has been in the process of construction for several months. It is almost completed now and is expected to fire up the boilers soon to start operations early in March. It is somewhat smaller than the plant of the Texas Gulf Sulphur Company at Boling dome, but is equally as modern in its fittings, power and equipment.

# Louisiana--Arkansas Field Notes

# Zwolle Extension Area Gets Salt Water Show in Three Tests

SHREVEPORT, La. — Salt water was found in three wells in as many directions from the extension discovery well at Zwolle last week, while 17 new locations were announced for that area, including three in the original field.

The most optimistic development from a production standpoint in Zwolle was completion of V. M. Miller's Colquitt 1, NE SE Section 31-8-12, which came in at 2191 feet in marl, flowing at the rate of 1000 barrels daily choked in but bridged over and went dead within a few hours after completion. Six and five-eights inch casing had been set at 2176 feet, top of the marl. Efforts are now being made to revive the test which was an eastern offset to Lion Oil Rfining Company and Lide and Associate's Sabine Lumber Company 1 in the west half of the same quarter, which came in in the marl several weeks ago extending production in the east field three miles west and slightly south and serving as a connecting link between the two producing parts of Zwolle.

An interesting development in the latter well was the fact that it was opened wide for two hours while Miller's well was flowing and Sabine Lumber Company 1 began to show salt water to the amount of 16 per cent, causing operators immediately to choke it back in, whereupon the salt water dropped back to only two tenths of one percent. This was the first time that salt water had shown in any of the four producers of the east field, although Benedum and Trees Oil Company's Bowman-Hicks A-1, NW SE Section 34-8-12, has never been opened wide. The eastern extension well, however, has never shown a particle of salt water and is still maintaining a steady flow of over 3200 barrels daily from chalk rock.

The three salt water holes were tests which had shown oil at various depths in the chalk rock but not sufficiently, operators apparently believed, to make commercial wells. After drilling through the chalk rock the Blossom sand notorius for its salt water in Zwolle, was encountered, abandonments resulting.

Gay and his geologist, H. D. Easton, the latter having in 1922 mapped the structure from which the discovery resulted, found from experience in the older Zwolle field in Section 14-7-14 that in many instances a "waiting game" must be played with the Zwolle chalk rock production unless a flowing well was found. Wells that have bailed dry when agitated have slowly mounted in oil until they made 100 barrel wells or larger. Ohio Oil Company used this method in its first producer in Zwolle getting a 45-barrel pumper in Bowman-Hicks 1, NW SW Section 35-8-12, a half mile east of the extension flowing well.

The three failures recorded during the week are: Warner-Quinlan Company's Sabine Lumber Company 1, NW NE Section 34-8-12, a half mile northeast of the extension producer, which flowed salt water at 2730 feet; Ruston Drilling Company's Holliday 1, SW NW Section 35-8-12, a northern offset to the Ohio's Bowman-Hicks 1; Holliday 1 testing salt water at 2728 feet after showing oil at several higher depths, and Haynes Brothers' Meyer 1, SE NE Section 28-8-12, a mile and a quarter northwest of the extension producer, the Meyer well having been abandoned at 2800 feet after good shows of oil in the chalk rock.

Twelve of the new locations for Zwolle were in the vicinity of the Lion Oil Refining Company and Lide's Sabine Lumber Company 1, Section 31-8-12, the new tests being in Section 31 and 32-8-12.

Dixie Oil Company is rigging up for Nunn 1, Section 32-8-12. In the same section Air Lift Oil Company and Root Refining Company drilling Leone 1 jointly have derrick up. Broderick and Calvert, a new entry in the field, have derrick pattern for Sabine Lumber Company 1 in Section 31-8-12. Other new locations are : G. N. Broderick's Bolin 1, Section 31-8-12; Joe Burnham and Associates' Bolin 1 in the same section; David and Tyson's Neville and Roberts 1 in the same section, rigging up; Floyd Oil Corporation's Barnett 1 in the same section, a derrick; Glassell and Merren's Thomas 1, in the same section, a derrick; Hebert Oil Company's Noble 1 in the same section, a location; Sabine Lumber Company's Fee 1, Section 3-18-12, a derrick; W. S. Smith and Associate's Colquitt 1, in the same section, a derrick; and their Williams 1 in the same section, a derrick pattern.

### Cartersville

Seven new locations and one 10-barrel producer were the net results of the week in the Cartersville district. The 10-barrel producer is Natural Gas Production Company's United States 1, Section 31-23-11, which is pumping from 3174 feet.

Chief interest during the week in Cartersville was centered in Air Lift Oil Company and Bahan and Bahan's Mays 1, Section 26-23-12, where a drill stem test of 18 fourbles of oil and three of salt water were obtained in 14 minutes from 2960 to 2970 feet. Six and five-eighths inch casing was set at the higher level and plug was to have been drilled Thursday, March 6, but was deferred for a few days. This sand is approximately 100 feet above the old Cartersville gas horizon and 200 feet above the Woodbine pay where oil has heretofore been obtained.

An eastern offset to Cartersville production, Arkansas Fuel Oil Company's Bolinger 1, recently acquired from Northwest Louisiana Natural Gas Company, in Section 38-23-11, is ready for bailing at 3174 feet after an oil sand was encountered from 3167 to 3169 feet with sandy shale showing oil for the next five feet. Six and five-eighths inch casing was set at 3167 feet.

About five miles south of the old Spider district of De Soto Parish, and seven miles north of the Benson district of the same parish, Benedum and Trees Oil Company during the week completed a wildcat test, Johnson 1, Section 7-11-13 as a gasser gauging 12,859,500 feet with a little salt water, at total depth of 2865 feet. Rock pressure is 960 pounds. Operators are installing two-inch tubing to carry off the salt water.

Triangle Drilling Company's Kilpatrick 1, SW NE Section 7-19-5w, Claiborne Parish, Sugar Creek district, 18 miles southeast of the old Homer field, was deepened to 4558 feet during the week with 10 feet of sand at the bottom and is being allowed to blow. It is making one and a half to two million cubic feet of gas with a spray of

about 10 to 20 barrels of oil with occasional salt water showing. This is no improvement over the results obtained 18 feet above. The gas is high in gasoline content, testing 1.2 gallons to the thousand cubic feet. The formation is the upper Trinity. Unless the well improves materially it probably will be deepened again as a test to the lower Trinity can be made, nine-inch casing having been set at 4266 feet.

### Arkansas

Two wildcat completions, both making a little oil, were recorded in Arkansas during the week. Louisiana Oil Refining Corporation has finally standardized Halton Tucker 1, Section 15-15-19, Ouachita County, and it is pumping 12 barrels of oil and 500 barrels of salt water from 2260 feet. In the Hillsboro district of Union County E. G. Bradham's Craig 1, Section 6-18-15, was put on the beam at total depth of 2200 feet and is pumping six barrels of oil and 30 barrels of salt water.

Five small producers, all of which are making more salt water than oil, except one, were completed during the week in the old Smackover district. The largest was 37 barrels daily yield of oil. All are pumpers.

Two new locations were announced in Arkansas. South and east of the Champagnolle district of Union County, O. W. Estes will drill Bates 1, SW SW Section 13-17-14. M. W. Greason made location for Spears 1, NE NE Section 9-7n-29w, Sebastian County.

Marine Oil Company's Thompson A-3, Section 10-18-13, the discovery oil well of the Urbana district, Union County, and Arkansas' deepest producer, having total depth of 3539 feet, for the seven days immediately preceding March 6 averaged 875 barrels of fluid on the beam with salt water ranging from 34 to 42.2 per cent. Three tests are drilling in that area, Marine Oil Company being in gummy shale at 2090 feet in P. Winn Estate B-2, Section 10-18-13, Lion Oil Refining Company being in hard sandy lime and red shale at 2930 feet, and Simms Oil Company being in gummy lime at 2394 feet in M. H. Simmons 1, both in Section 10-18-13. There are also several other locations in the area.

One new wildcat location was made in East Texas, A. A. Trammell, Trustee's Hussey 1 in the Lockhart survey, Marion County. In Shelby County, Benedum and Trees Oil Company has set nine-inch casing at 2762 feet with total depth of 2832 feet in McCann 1 in the Nancy Beattie survey.

## Louisiana Permits Ahead Of Last Year

Shreveport, Louisiana.—Drilling activity in Louisiana during the first two months of 1930 was considerably above the level for the corresponding months of 1929, according to figures of the minerals division of the Louisiana Conservation Commission. Total drilling permits to March 1, 1930, are 154 as compared to 131 for January and February, 1929. Eighty-five drilling permits were issued for February this year as compared to 65 for that month last year. Big drilling campanies in Zwolle (Sabine Parish) and Cartersville (Bossier Parish) account largely for the increase. Bossier securing 16 drilling permits in February, 1930, and Sabine receiving 30. Total permits for all purposes to March 1 this year are 238 as compared to 278 for the same months of 1929. Since January 1, 1930, besides the 154 drilling permits there have also been 15 to deepen, 61 to abandon, one to plug back, one to sidetrack, one to abandon temporarily, three to shoot formation, one to perforate and one to workover. There were seven to deepen, 31 to abandon, one to plug back, one to sidetrack, one to abandon temporarily, and two to shoot formation, issued in February this year.

***Shreveport.—R. L. Gay has added his fifth producing well in the older Zwolle (Blue Lake) area of Sabine Parish, Sabine Lumber Company 3, Section 13-7-14, a quarter mile east of production. It came in March 9 flowing 50 to 100 barrels by head from chalk rock at 2439 feet.***

***The oil is 46.4 gravity, about three degrees higher than other wells in Blue Lake and seven degrees above East Zwolle oil. V. M. Miller's Colquitt 1, NE SE Section 31-8-12, which bridged after coming in marl at 2191 feet, has been cleaned and is making 1,000 barrels daily being kept agitated.***

***Hopes of a higher producing stratum of the Woodbine in Cartersville, Bossier Parish, were blasted when Air Lift Oil Company's and Bahan and Bahan's Mays 1, Section 26-23-12 tested salt water with a trace of oil at 2970 feet. It will be deepened to the present oil horizon below 3100 feet.***

## Shreveport Geologists Plan Arkansas Trip In June

Shreveport, La. — The Shreveport Geological Society will make its annual field trip into southwest Arkansas to study the outcrop of the lower Cretaceous in that region, it was decided at the monthly meeting of the society Friday night, March 7. A committee consisting of S. E. Mix, chairman, and C. L. Moody and M. L. Israelkys was appointed to arrange details for the trip which will be made early in June.

H. K. Shearer reported to the society that progress is being made in the investigations of a committee appointed to take some action in the standardizing of the geological names of formations found in this territory.

George W. Schneider gave a report that arrangements have been completed for the "Evangeline Bayou Teche Trip" for the merican Association of Petroleum Geologists which meets at New Orleans March 20-22. The trip will be made March 19.

Mr. Schneider also gave a discussion of South Louisiana salt domes.

## Gardena Wildcat

Los Angeles.—Ohio Oil Company, a comparatively recent entry into California, continues its aggressive policy, having made a location for a wildcat test to be drilled in the Gardena district. The location is in the northwest quarter of Section 35-3-14 and about one mile northwest of a 6500-foot well drilled several years ago by Chanslor-Canfield Midway Oil Company.

# Satisfactory Progress Being Made On Mississippi Wildcat Tests

JACKSON, Miss.—Gulf Refining Company is making excellent progress on the first of three tests it plans to drill in Rankin County, Mississippi, just across Pearl River from Jackson. Its Rainey 1, Section 13-5n-1e on Friday, March 7, having been drilling in gray lime at 1464 feet after setting 12½-inch casing at 960 feet.

Jackson Oil & Gas Company has temporarily abandoned Mayes 1, Section 2-5-1e, Hinds County in the city of Jackson but a two-inch line has been laid to a new test about half a mile north where derrick is up for Taylor 1, Section 35-6-1e. The Mayes test showed about two million feet of gas and 2,000 barrels of brackish water when bailed in at total depth of 2585 feet. Riging up is under way at Taylor 1.

Meridian Natural Gas Company has resumed drilling in Mattie Houser 1, Section 33-8-18e, Lauderdale County, Mississippi, near Meridian. The test is now ratholing in limey shale at 2741 feet.

Alcorn Petroleum Company is trying to shut off water in Matthews 1, Section 14-2-7e, Alcorn County, Mississippi, at 2393 feet where six-inch pipe was landed after a 100 quart shot was made at 2500-2525 feet, with total depth of 2735 feet.

Mrs. Ella Rawls Reeder is making up three-inch drill pipe to resume operations in State Land 1, Section 25-6-1e, Hinds County, Mississippi, the test having been shut down at 2905 feet.

Amerada Petroleum Corporation is coring black shale at 4528 feet in Campbell 1, Section 24-12-2, Yazoo County, Mississippi.

# News from the Rocky Mountain Fields

## Perry Park

Denver, Colo.—A test for the Perry Park structure, Douglas County, south of this city, is among the interesting announcements made this week for Colorado operations. W. L. Christiana, formerly chief geologist for Continental Oil Company, has a block of 30 sections leased up in the district, and a test is to be started before August 1. Mr. Christiana did all of the geological work and took the leases in his own name, but it is understood that whether he drills it himself or deals with a major operator has not yet been decided. Several operators are said to be favorably impressed and ready to make a deal. The test will be a shale and Dakota one, and will be drilled more than 3000 feet.

While the Perry Park is well known on account of its peculiar geological formations, and while there has been some leasing in the district in the past, there has never been a thorough test of the area. In 1926 the A. A. Rollestone interests drilled a well and abandoned it at 3400 feet. There was no information given out on the test, and all operations were conducted very secretly.

## Showing in Tensleep Sand Considered Important

Casper, Wyo.—Another proof of the production of the Tensleep sand in Wyoming fields was made this week when the test drilled jointly by Producers and Refiners Corporation and Midwest Refining Company, in the Mahoney Dome field, in Carbon County, developed 2000 feet of oil in the hole 50 feet in the sand topped at 4650 feet. Value of the discovery is not definitely known, and the sand is being very carefully drilled into.

The discovery of oil in the Tensleep sand so far south in Wyoming is most important and will doubtless lead to further exploration in other fields in the Little Lost Soldier basin, at Wertz Dome, at General Petroleum dome, and in the Ferris field.

Producers & Refiners Corporation had a good showing of high grade black oil in a deep sand test at Ferris about two years ago. This well had an initial production of about 700 barrels, but deeper drilling developed water which ruined the well.

## North Casper Creek

Casper, Wyo.—Operations in the North Casper Creek field, Natrona County, Wyoming, which have been shut down for a time, have recently been resumed. The No. 3 well, which has been standing with casing set on top of the oil sand, is to be drilled in immediately. The company has completed storage tanks and a spur track has been built by the North & South Railroad the 1½ miles from the field to its railroad. The All State Oil & Gas Company, owner of the field, will start producing and shipping oil at an early date.

## Salt Creek

Casper, Wyo.—The interesting deep test of Midwest Refining Company in the Salt Creek field which is being drilled with the idea of testing all of the possible producing sands in this remarkable field to the granite, is reported to be drilling through the Tensleep, very slowly, and producing about 500 barrels from this sand. The original plan of continuing to the granite will be followed out, in spite of the vast production already developed in shallower horizons in this well.

## Pondera

Great Falls, Mont.—There have been two interesting completions made in the Pondera field recently. Teton Corporation's Jones 2 is good for about 500 barrels at 2014 feet on the west side of the field, and proof of its worth will add stimulus to the spring drilling programs in the field. Warren Oil Company completed Jones 3 for about 250 barrels at 2012 feet, and has been beaned down to 100 barrels because of lack of field storage adequate to handle it.

## Ohio Moving Wyoming Tanks to California

Casper, Wyo.—Ohio Oil Company is cutting down four of its 55,000-barrel tanks at Illco, west of here, and is shipping them to Venice, California, where it recently completed wells proving a new field on the Recreation Gun Club property.

## Black Mountain

Thermopolis, Wyo.—The production test of the Black Mountain field east of this town has been completed by Utah Oil Refining Company, and while the wells made a very good showing it is understood that no pipe line is to be laid until later, after another well has been drilled in the spring.

## Teapot Dome

Casper, Wyo.—Work has been resumed by Wind River Oil & Gas Company on the Teapot Dome structure on the well which has been standing at 2235 feet during the winter.

**California Halts Tank Building**
(Continued from page 63)

ent level allows little leeway and continued over-production might force the moving of gasoline against the benefit of both California and other districts.

Gasoline has long been a guide to general conditions and the present surplus is the result of blunders in the producing end. Gasoline stocks were not forced up by the over-production of crude, but were the natural result of intensive development. The present stock is sufficient to care for both domestic and foreign needs for about three months. A sharp reduction in refinery runs would bring the total stocks down to satisfactory level within six months.

The sharp increase in production of natural gasoline during 1929 was a big factor in the jump of all gasoline stocks. The blending of this product with straight run gasoline was felt throughout the year. The quantity of natural gas available at very low cost was reflected in maximum operation of nearly all natural gasoline plants.

Naphtha distillates have not been a distributing factor in California for several years, although stocks exactly doubled between February 1, 1929, and the same date of this year, standing at 3,281,669 barrels. This compares with 6,339,453 barrels on April 1, 1926, the former peak for all products, and 13,114,490 barrels on January 1, 1924.

Miscellaneous stocks climbed to 10,124,457 barrels on February 1 of this year, as against a slightly smaller total at the same time last year. The total for these odds and ends should be lower and undoubtedly will be reduced during the year if major products stage a rop.

The cost of carrying the 186 million barrels of petroleum products will run about 31 million dollars per year. The burden is already being felt, but future years will show deeper scars. Eventually it will be necessary to make write-offs of equipment losses, while evaporation is taking its toll all the while. Under present conditions there is little wonder that the industry is trying to reduce stocks.

A forecast of stocks during the remainder of the year could be made on the basis of a production of 610,000 barrels, but even the most optimistic do not believe that the output will be lowered to this figure. If one-half of the amount gained in total stocks during 1929 is lost during 1930, the industry will end the year in a comparatively healthy condition. Present indications point to a gross reduction of about 15 million barrels by February 1, 1931. With curtailment still a questionable factor, a less favorable turn is possible.

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Petroleum Chemical Company of Tulsa has been granted patents by the U. S. patent office on its process for breaking petroleum emulsions being manufactured and marketed under the trade name of Kemy. The company maintains a plant in Tulsa with representatives at principal points in the field.

# News From California Fields

BRAD MILLS, *Staff Representative, Los Angeles, California*

# California Curtailment Progress Considered Satisfactory

LOS ANGELES.—With production showing a steady decline and a sharp reduction in refinery runs announced by leading companies, developments during the first week of curtailment under the proposed plan to reduce the output to 609,000 barrels are regarded as satisfactory. The two largest fields in California are still producing above their allowable totals, but with several fields actually under their allotments and other districts almost exactly "on the line," the excess in the most critical areas loses much of its weight.

Immediately after the present program was inaugurated the reduction was rapid, the first three days having accounted for the bulk of the drop for the week. This was expected, just as the reduction of the output from around 650,000 barrels to the desired level is expected to be accomplished only with much effort. Curtailment in California has been somewhat similar to community chest drives. The first 60 per cent of the objective is obtained with little effort, while the remaining 40 per cent is difficult to get.

### Santa Fe Springs

Production has been reduced to 159,000 barrels at Santa Fe Springs, but the shaving off of another 10,000 barrels is causing considerable worry. Due to the excess during the first week, a reduction to around 140,000 barrels may be necessary to balance off the penalties. As the leading companies have met their allowables, it remains only for those opposed to curtailment and the few who have made partial reductions to make the program entirely effective. Two companies with a combined production of about 25,000 barrels are standing in the way of a perfect record for the field. One of these—Wilshire Oil Company and subsidiaries—has never cooperated with the umpire. The other has signed the agreements but has used technicalities to avoid the proper reductions. Fear that operators offsetting those not willing to curtail will become restless has had a slightly depressing effect but larger operators will carry out the program to the letter.

Rapid decline of the Santa Fe Springs field has both helped and harmed the curtailment program. Some have claimed that since the field would soon be down, there is little reason for cutting back production. Others have advanced the argument that even though the field is declining rapidly, there is every reason to reduce the output until all danger is removed and the crude market stabilized. If production can be held down for 60 days, the field will no longer be a menace unless a good zone below the Clarke is found.

### Long Beach

Many operators at Long Beach insist that they thought they were to reduce only on a basis of a field allowable of 100,000 barrels and not 89,422 barrels, as actually determined by the Fact-Finding committee. Companies making this claim are greatly in the minority, but they represent a faction large enough to cause dissension. Production remained around 110,000 barrels until the last day of the week, when it dropped to about 103,000 barrels. There is doubt whether the output will be reduced to a figure far below 100,000 barrels.

### Elwood

Production at Elwood is running exactly with the allowable, making it the ideal field of the state. Operators have been running under the necessary figure during the first part of the month and making adjustments later in the period.

Inglewood, Kern Front, Mt. Poso, Round Mountain and West Coyote are slightly under the allowables.

### Huntington Beach

Huntington Beach presents a very difficult problem, with many small operators insisting that they find it difficult to produce their leases profitably at the maximum rate. The major companies have made their cuts but the reductions total only half of the desired amount. A further reduction is expected from companies who were slow in signing the agreement and at least 75 per cent of the desired cut is expected.

Fields producing more than their allowables are all far below their potentials, with at least a limited effort being made to meet provisions of the agreement.

Only the most optimistic believe that the actual allowable of 609,000 barrels will be reached. It is the objective, however, and as the actual output is shaved down the correct figure seems possible.

### Refinery Curtailment

Announcement by Standard Oil Company of California that effective immediately it will operate its refineries on the equivalent of a six-day week, other major and independent companies followed with similar announcements. Since refinery runs are of necessity continuous, Standard Oil Company will accomplish the desired cut by reducing weekly runs of crude oil to stills by one-seventh. This will be done without the laying off of any labor and without reduction in pay. The company has announced that it will continue to operate on the reduced schedule so long as conditions permit, and in case this plan

**SUMMARY OF PRODUCTION OF THE FIELDS SUPERVISED BY UMPIRE P. H. GRIMM**

| | Daily Potential March | Daily Allowable March 1-15 | Actual Production March | Daily Average Production March 1-5 Inclusive |
|---|---|---|---|---|
| Elwood | 64,579 | 36,810 | 184,004 | 36,801 |
| Inglewood | 23,245 | 18,596 | 91,150 | 18,230 |
| Kern Front | 22,626 | 12,897 | 61,903 | 12,381 |
| Lost Hills Belridge | 8,630 | 2,090 | 10,450 | 2,090 |
| Lawndale | 700 | 700 | 3,500 | 700 |
| Maricopa Flats | 20,810 | 11,862 | 68,592 | 13,718 |
| Montebello | 9,200 | 6,716 | 38,714 | 7,742 |
| Mount Poso | 20,783 | 11,846 | 41,932 | 8,386 |
| Playa del Rey | 1,900 | ..... | ..... | ..... |
| Potrero | 900 | 900 | 4,500 | 900 |
| Round Mountain | 7,570 | 3,785 | 14,223 | 2,845 |
| Santa Fe Springs | 271,197 | 144,960 | 795,488 | 159,098 |
| Ventura Avenue | 74,348 | 42,378 | 223,158 | 44,632 |
| West Coyote | 10,950 | 9,855 | 49,067 | 9,813 |
| Total | 537,438 | 303,395 | 1,586,681 | 317,336 |

does not produce sufficient gasoline to meet its outstanding obligations, it will purchase gasoline from other California refineries, if such is available, rather than to increase the runs of crude oil to its own stills.

Union Oil Company has also announced that it will reduce runs to stills by one-seventh and will continue the policy as long as necessary. This company has been a leader in conservation circles and immediately reduced refinery runs as a necessary addition to efforts being made to reduce the crude output in California.

Other companies are expected to reduce runs to stills in roughly the same proportion as reduction of crude oil production bears to the output before the allowable of 609,000 barrels. In some cases, it will be approximately one-seventh, but actual needs of the various companies will guide the reductions. The movement is growing for a reduction at all refineries where an excess of gasoline is being made.

Several large refiners made a sharp reduction in runs to still on February 1, gasoline stocks have reached a dangerous total. Richfield Oil Company reduced runs to stills a full 20 per cent, with other refiners reducing to prevent a still more dangerous accumulation of gasoline stocks.

Runs to stills and the natural increase in gasoline stocks have presented as serious a problem in California during the past year as overproduction itself. Attention has recently been turned to a reduction in refinery operations as one of the best means of getting at the bottom of overproduction of crude. One is so dependent upon the other that they are forced to carry the blame for poor conditions in the industry.

## Kettleman Hills

Coalinga, Calif. — Curtailment and promise of only a limited amount of drilling have placed a dullness on Kettleman Hills which has not been apparent since late in 1928. With a total of 13 active wells on the three domes, the field has two or three tests which are apparently out of the running so far as production is concerned. Any well is important at Kettleman Hills and for this reason the result of each test is being followed closely. Hard luck continues to cling to the efforts of Ohio Oil Company to obtain production in Smith 1, a South Dome well which was drilled to 8055 feet. While swabbing above a plug at 7000 feet, water broke in and spoiled the test of showings logged several months ago. The well will be abandoned. Associated Oil Company has reached 6100 feet in Whepley 1, an offset to Petroleum Securities Company's Felix 1, now on production. Superior Oil Company has picked up the brown shale at 5848 feet in Huffman 1, located more than three miles northwest of the discovery well, this discovery indicating the North Dome to extend north and west in a more uniform manner than to the south.

# Santa Fe Springs No Longer Production Threat

LOS ANGELES—Santa Fe Springs, four months ago a real sensation and feared as a menace to the industry, is no longer a serious threat, barring the possibility of the 9000-foot Hathaway zone. After the disappointing showing this field made a month ago, it was evident that peak of production had been definitely passed in the Clarke zone and a definite decline ahead.

There is a growing tendency to stop wells in the Buckbee and O'Connell zones, a practice which was not expected when the wells in question were started. The action of the Clarke zone during the week changed the policies of several operators who have been enthusiastic concerning the sand. Eleven wells were completed with an average initial production of 575 barrels. The yield of these wells was in sharp contrast to those completed a few months ago on the same property, where 5000-barrel producers were not uncommon.

The sharp drop in the number of active drilling operations was an outstanding development of the week. There are now only 115 drilling wells, of which 54 are about to be completed in the Clarke zone and 61 are drilling in shallower formations. The wells in or near the Clarke zone should be completed within six weeks, while those drilling above the deepest producing zone probably will be finished within two months. Many of the latter will stop in the Buckbee and O'Connell zones, although a few will venture on to the Clarke sand.

A few wells are being completed in the Meyer zone, a formation which would not have been noticed six months ago. By plugging back to this sand Union Oil Company completed Howard 14 with an initial production of 500 barrels. Located on the north flank of the field, the performance of this well was a distinct surprise. Completion of good wells on the compressor in the Meyer zone is not an uncommon occurrence.

The O'Connell zone has been the best of the four developed below the Meyer during the past 18 months. The Buckbee zone was the discovery sand but probably could not produce more than 20,000 barrels on an actual test. The Nordstrom zone is producing about 6000 barrels but could double this output if necessary. The O'Connell zone is producing above 40,000 barrels and is now the most dependable formation in the field. Clarke sand production is dropping sharply and with many wells originally intended for this zone now retreating upward, or stopping in the shallower sands for the initial test, the output will continue to fall.

The Texas Company is drilling at 8865 feet in Patterson 10, making it potentially the deepest producer in the world. The formation shows shale and streaks of sand.

Richfield Oil Company's Mayberry 1 has reached a depth of 8555 feet and is also a candidate for deep honors.

Wilshire Oil Company has passed 8675 feet in Baker 4-A and may add to its laurels, this company having discovered the Buckbee zone in July, 1928.

Oscar Howard is still content to let Hathaway 7, world's deepest well, remain idle, the 9356-foot test having failed on two tests of the 4¼-inch water shutoff at 8737 feet.

# California Supply Men Plan Chamber Division

LOS ANGELES. — More than 100 representatives of oil well supply houses and manufacturers of oil field equipment, met in called session March 3 in Los Angeles, and decided to form a new division of the California Oil & Gas Association. Herbert R. Macmillan, president of the association, presided and was instructed by vote to name a committee of five to meet with a committee from the directors of the association to work out plans for the new division.

Mr. MacMillan explained that the association directors had decided that the supply men and manufacturers probably would welcome an opportunity of forming a division for their own benefit with the association, and called upon Edwin Higgins, managing director of the association, to explain the reasons for the movement. Mr. Higgins said there were many matters of common interest which a new division could work out to the betterment of the whole.

R. A. Broomfield, president of Barnsdall Oil Company of California, and a former president of the association, approved the movement, stating that the supply men and manufacturers had found that such an organization was most profitable within the gas association.

Lester Kiem, manager of Oil Well Supply Company of California, also approved the movement, as did Joe Dunn, sales manager for National Supply Company of California. Mr. Dunn suggested that a general committee from among the supply houses and manufacturers be named, and that smaller committees be named to represent the various interests, such as supply houses, manufacturers of equip-

ment, core drill concerns, etc. This idea was seconded by F. C. Merritt of the Elliott Core Drill Company .

Mr. Macmillan was instructed to name the committee of five, and after this committee had met with the association committee and formulated a general plan, another meeting would be called to approve recommendations to be presented by the two committees.

The committee from the association is composed of R. A. Broomfield, Wm. Reinhardt, Lester Kiem, Arch McDonald and Edwin Higgins.

The committee from among the supply men and manufacturers as named by the president, includes H. H. Hillman, Hillman-Kelley, Inc.; Hubert Allen, Alco Oil Tool Company; F. C. Merritt, Elliott Core Drill Company; Ward Blackburn, Ingersoll Rand Company; D. S. Faulkner, National Supply Company; H. H. Clark, Baash-Ross Tool Company; Chas. D. Wagner, Emsco Derrick and Equipment Company.

## Venice

Los Angeles.—Ohio Oil Company has made another location in the Venice field, indicating that several wells will be completed as a check against the discovery well. The new location, Dickenson 1, is a short distance northeast of Del Rey 1. The company has made a successful water shutoff at 3925 feet in Gun Club 2 and will test the upper sand which was logged in the discovery well but which did not yield commercial production. Union Oil Company has completed a rig for its first test in the field and will soon start drilling on its 480-acre lease. Several other wells will be started in the townlot section as soon as final permission is granted from the Los Angeles city council.

## Santa Barbara County Wants Drilling Halted

Carpenteria, Calif.—Using an old grant for a highway along the beach adjacent to this place as a basis for claim that drilling for oil on tideland permits is unlawful, county supervisors of Santa Barbara County are attempting to stop operations now under way. The right-of-way for this ocean highway was supposedly granted in 1887 but for some reason the road was never built. It is claimed by the supervisors that drilling for oil and gas along the beach will spoil or hinder the best bathing strip adjacent to Carpenteria.

## Long Beach

Long Beach, Calif.—The southeast part of the Long Beach field continues to hold the center of interest, the completion of a 1600-barrel well by Plymouth Oil Company giving this sector a decided advantage over the intensely drilled area lying northeast of Signal Hill. This part of the field has been responsible for the best completions recorded during the past three months .

*Arrangement for launching a sea line*

# Largest Submarine Oil Line Constructed on Shore

OIL from Kettleman Hills is conveyed to Estero Bay on the Pacific Coast through a 70-mile pipe line, recently completed by Standard Oil Company of California. This line, which is of 10-inch pipe, is completely welded and carries oil under an initial pressure of 1000 pounds per square inch to storage tanks on the coast, no booster-stations being used.

Since a deep water harbor is not available at this point, a 16-inch submarine pipe line has been constructed to carry the oil from the storage tanks on shore out to the tanker anchorage 3000 feet at sea. At this point the oil is loaded for transport to the refineries by means of a hose attached to the seaward end of the pipe and connected to a buoy by a chain. This submarine line was entirely welded by the oxy-acetylene process, the standard open vee butt weld being used without straps or any reinforcements.

One of the most interesting features of this line is that it was entirely constructed on shore, a narrow-gauge railroad extending 3000 feet inland in a straight line on a two per cent grade, having been constructed especially for the purpose. All welding was done at the inland end of the track, and as fast as lengths of pipe were added to the line at this point it was moved forward toward the shore on trucks running on the narrow-gauge tracks. The illustration shows the complete portion of the line on its way toward the sea. When completed the end of the line was capped, equipped with a sled and towing bridle and pulled out to sea by means of a tug. A hydrostatic test showed that the welded line had withstood the launching operation perfectly and was ready for service.

## McKittrick

Taft, Calif.—H. L. Whiston's Wisecarver 1, a wildcat test in the McKittrick district, is producing about 25 barrels of oil and a small quantity of gas from 5035 feet, contrary to press reports that the well was producing 1000 barrels of high gravity oil from the Temblor sand. Production is coming from the brown shale which has produced over a wide district. The well will be drilled deeper.

## Approach Depth Record in Midway Test

Taft, Calif.—Standard Oil Company is well on its road to a new world record in Mascot 1, a test in the west side of the Midway field, a depth of 9200 having been reached. The formation is showing hard brown shale and streaks of sand. Only two other wells have ever been drilled deeper—Shell Oil Company's Nesa 11, a 9280-foot test in the Long Beach field, and Oscar Howard's Hathaway 7, the present record hole, now standing at 9356 feet.

## Coney Island

Los Angeles.—A lease has been acquired on Coney Island, a small tract in Newport Bay and about five miles southeast of Huntington Beach, drilling to start within 90 days. Jack M. Sickler and others of Pasadena obtained the lease on the island, following extended geological work. Shallow oil has been produced near Newport Bay for years.

(Continued from page 72)

### COOKE COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Humble Oil and Refining Company | 1 | 20,000 | 20,000 |

### DALLAS COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Oriental Oil Company | 1 | 55,000 | 55,000 |
| Simms Oil Company | 3 | 80,000 | 240,000 |
| Simms Oil Company | 1 | 55,000 | 55,000 |
| The Texas Company | 36 | 55,000 | 1,980.000 |
| The Texas Company | 6 | 120.000 | 720,000 |

### EASTLAND COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Production Company | 19 | 55,000 | 1,045,000 |
| Humble Oil & Refining Company | 36 | 55,000 | 1.980,000 |
| Humble Oil & Refining Company | 1 | 37,500 | 37,500 |
| Humble Oil & Refining Company | 1 | 35,000 | 35,000 |
| Magnolia Petroleum Company | 28 | 55,000 | 1,540,000 |
| Prairie Oil & Gas Company | 57 | 55,000 | 3,135,000 |
| Prairie Oil & Gas Company | 4 | 37,500 | 150,000 |
| Prairie Oil & Gas Company | 11 | 35,000 | 385,000 |
| Sinclair Pipe-Line Company | 6 | 55,000 | 330,000 |
| The Texas Company | 12 | 55,000 | 660,000 |
| T P Coal & Oil Company | 6 | 55,000 | 330,000 |
| United Producers Pipe-Line Company | 1 | 37,500 | 37,500 |

### HALL COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Pipe Line Company | 1 | 55,000 | 55,000 |

### HUNT COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Pipe Line Company | 1 | 37,500 | 37,500 |

### KNOX COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Magnolia Pipe Line Company | 3 | 55,000 | 165,000 |

### MONTAGUE COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Continental Oil Company | 2 | 55,000 | 110,000 |
| Gulf Production Company | 1 | 55,000 | 55,000 |
| Magnolia Petroleum Company | 14 | 55,000 | 770,000 |
| Sinclair Pipe Line Company | 2 | 55,000 | 110.000 |

### PALO PINTO COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Sinclair Pipe Line Company | 2 | 35,000 | 70,000 |
| The Texas Company | 1 | 55,000 | 55,000 |
| United Producers Pipe Line Company | 3 | 55,000 | 165,000 |

### PARKER COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Pipe Line Company | 1 | 55,000 | 55,000 |

### SHACKELFORD COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| The Texas Company | 1 | 37,500 | 37,500 |

(1) Located on Oklahoma side Burkburnett field.

(2) Building

### STEPHENS COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Production Company | 2 | 55,000 | 110,000 |
| Humble Oil & Refining Company | 6 | 55,000 | 330,000 |
| Humble Oil & Refining Company | 2 | 37,500 | 75,000 |
| The Texas Company | 1 | 55,000 | 55,000 |
| The Texas Company | 1 | 20,000 | 20,000 |

### TARRANT COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Gulf Production Company | 4 | 55.000 | 220,000 |
| Gulf Production Company | 8 | 37,500 | 300,000 |
| Magnolia Petroleum Company | 44 | 55,000 | 2,420,000 |
| Magnolia Petroleum Company | 1 | 80,000 | 80,000 |
| The Texas Company | 8 | 55,000 | 440,000 |
| Star Refining & Production Company | 1 | 55,000 | 55,000 |
| White Eagle Oil Corporation | 4 | 55,000 | 220,000 |
| T P Coal & Oil Company | 4 | 55,000 | 220,000 |

### WICHITA COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| **Burkburnett—** | | | |
| Continental Oil Company | 4 | 55,000 | 220,000 |
| Gulf Production Company | 4 | 55,000 | 220,000 |
| Humble Oil & Refining Company | 9 | 55,000 | 495,000 |
| LaSalle Petroleum Company | 7 | 55,000 | 385,000 |
| Magnolia Petroleum Company | 2 | 55,000 | 110,000 |
| Old Dominion Oil Company | 1 | 37,500 | 37,500 |
| Sinclair Pipe Line Company | 25[1] | 55,000 | 1,375,000 |
| Skelly Oil Company | 1 | 55,000 | 55,000 |
| The Texas Company | 10 | 55,000 | 550,000 |
| Tidal-Western Oil Company | 1 | 55,000 | 55,000 |
| White Eagle Oil Corporation | 1 | 55,000 | 55,000 |
| **Electra—** | | | |
| Dale Oil & Refining Company | 1 | 37,500 | 37,500 |
| Gulf Production Company | 1 | 55,000 | 55,000 |
| Gulf Production Company | 1 | 37,500 | 37,500 |
| Magnolia Petroleum Company | 3 | 37,500 | 112,000 |
| The Texas Company | 4 | 55,000 | 220,000 |
| The Texas Company | 7 | 37,500 | 262,500 |
| **Iowa Park—** | | | |
| Continental Oil Company | 1 | 55,000 | 55,000 |
| Humble Oil & Refining Company | 1 | 55,000 | 55,000 |
| Iowa Park Production & Refining Company | 1 | 55,000 | 55,000 |
| The Texas Company | 1 | 20,000 | 20,000 |
| **Wichita Falls—** | | | |
| American Refining Properties | 3 | 55,000 | 165,000 |
| American Refining Properties | 2 | 37,500 | 75,000 |
| Roy I. Carter | 1 | 55,000 | 55,000 |
| Continental Oil Company | 3 | 55,000 | 165,000 |
| Continental Oil Company | 6 | 80,000 | [2]480,000 |
| Panhandle Refining Company | 2 | 55,000 | 110,000 |
| Panhandle Refining Company | 2 | 37,500 | 75,000 |
| Pure Oil Pipe Line Company | 6 | 55,000 | 330,000 |
| Pure Oil Pipe Line Company | 1 | 20,000 | 20,000 |
| J. I. Staley | 2 | 25,000 | 50,000 |

### WILBARGER COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Humble Oil & Refining Company | 2 | 55,000 | 110,000 |
| Magnolia Petroleum Company | 6 | 55,000 | 330,000 |
| Sinclair Pipe Line Company | 1 | 55,000 | 55,000 |
| Waggoner Refining Company | 4 | 55,000 | 220,000 |
| Waggoner Refining Company | 2 | 80,000 | [2]160,000 |

### WISE COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Magnolia Petroleum Company | 5 | 55,000 | 275,000 |

### YOUNG COUNTY

| Company | No. Tanks | Size Tanks in Bbls. | Total Capacity in Bbls. |
|---|---|---|---|
| Simms Oil Company | 1 | 55,000 | 55,000 |
| Sinclair Oil & Gas Company | 1 | 35,000 | 35,000 |

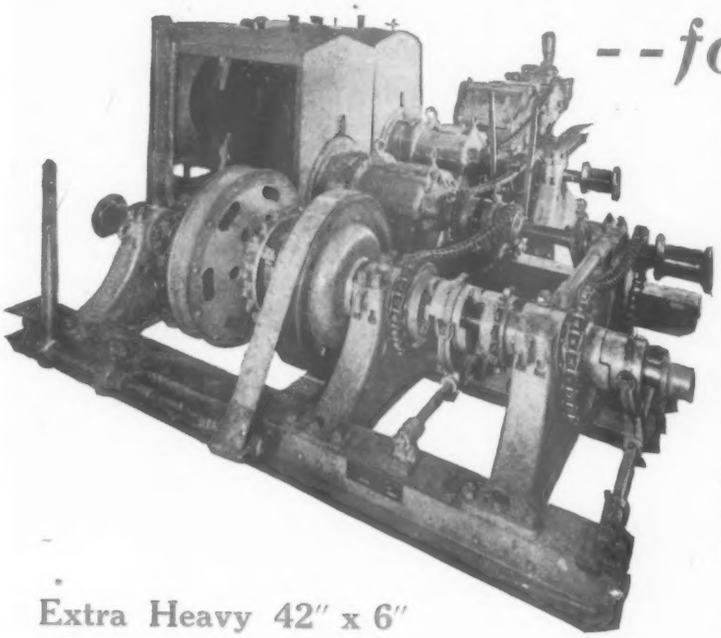
## Panhandle Tankage

Amarillo, Texas.—Tankage is in great demand in the Texas Panhandle district because of limitations placed on crude purchases during the past six months. More tanks have been barrowed, swapped and leased in this district than scouts can keep check on, and as result of this cooperation on the part of the producers and pipe line companies the numerous tanks left over from the flush days of the Hutchinson and Carson fields are being made available for Gray County crude. The district was over-supplied with storage when the first spell of heavy production subsided on short notice, but was unfavorably situated for handling the late flood of oil from Gray County without a manipulation of pipe line runs.

Producers sharing in the Gray County flush yield and also owning production and idle storage in Hutchinson and Carson Counties have been successful in getting pipe line companies to fill tanks in the latter two counties and take a like amount of Gray County crude. Producers in a few areas in Hutchinson and Carson Counties have likewise felt the restrictions placed on purchases by crude buying agencies, and have taken part in the tank leasing. The tankage plan has been advantageous to all, and has opened the way for containers now isolated from busy areas to be put into service.

# PORTABLE RIGS...

## --for deep drilling



Portable Rig Company's two types of drilling rigs provide an abundance of economical power for drilling operations to 6000 foot depths.

No other rig of equal power can be operated as cheaply as these natural gas or gasoline rigs. They effect economies in fuel consumption, maintenance, operation, and transportation, that cannot hope to be duplicated with any other type of rig.

Proof of this is found in the fact that major companies operating in domestic and foreign fields are standardizing on this type of drilling rigs.

### Extra Heavy 42" x 6" Reverse Clutch Unit

This unit is powered by a Waukesha 300 H.P. Great Six Engine. This power is transmitted to the Reverse Clutch Unit by Texrope Drive.

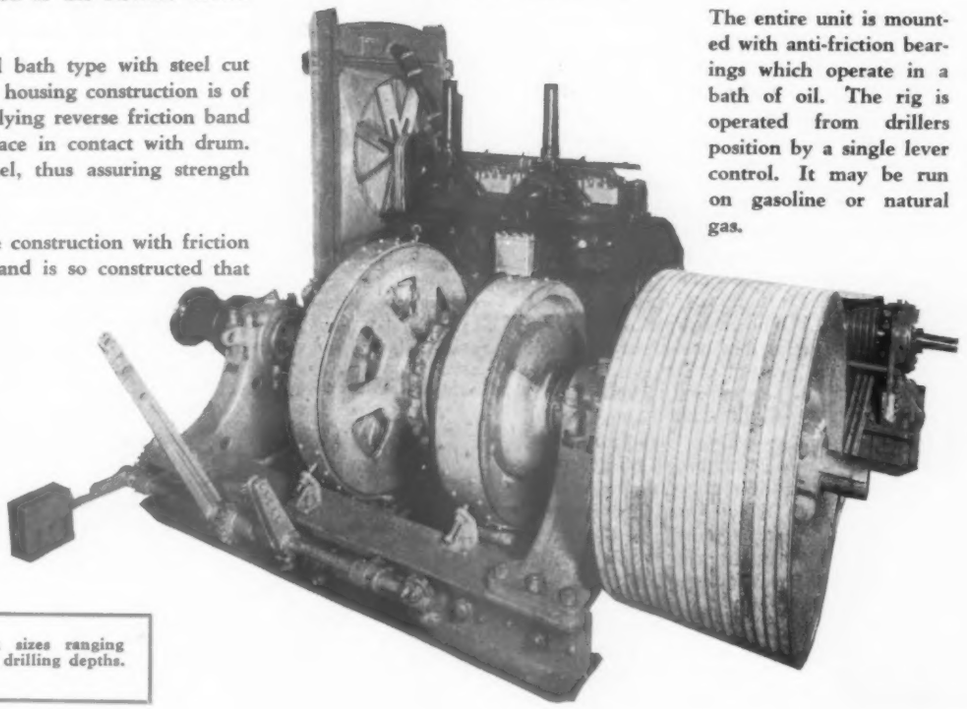
The Reverse Clutch is of the oil bath type with steel cut gears and hardened pinions. The housing construction is of the floating type. Method of applying reverse friction band allows over 90% of friction surface in contact with drum. The entire construction is of steel, thus assuring strength and long life.

The forward clutch is single plate construction with friction segments on both sides of plate and is so constructed that it is not necessary to remove shaft from bearings or disturb any of assembly except tie bolts in clutch housing to renew friction discs when they have become worn. This is due to split construction of driving plates.

### Heavy Duty 36" x 4½" Three Speed Draw Works Power and Pump Unit

Powered by two 125 H.P. Waukesha engines with the latest type heavy duty herringbone reduction gears. The units are arranged so that the power of either or both engines singularly or simultaneously can be used to drive the slush pump or diverted to the draw-works if desired by the operator.

The entire unit is mounted with anti-friction bearings which operate in a bath of oil. The rig is operated from drillers position by a single lever control. It may be run on gasoline or natural gas.



Portable Rigs are made in sizes ranging from 1200 feet to 6000 feet drilling depths.

# PORTABLE RIG CO. INC.

## HOUSTON, TEXAS

(Continued from page 68)

100 pounds with each block; the distances are started in blocks of 10-miles and extend to 100 miles, then 20-mile blocks up to 200 miles; then 25-mile blocks up to 300 miles; then 30-mile blocks up to 450 miles; then 40-mile blocks up to 970 miles and a last block of 30 miles where a rate of 47 cents is reached. Scale "B" is somewhat higher and is proposed for that section of Texas lying beyond that covered by Scale "A" also for application from points in Scale "A" territory to points in Scale "B" territory. It begins with 11 cents at 10 miles and extends to 1000 miles, increasing one cent per 100 pounds with every block. This scale begins with 10-mile blocks up to 100 miles; then 15-mile blocks to 160 miles; then 20-mile blocks to 300 miles; then 25-mile blocks to 550 miles; then 30-mile blocks to 1000 miles where a rate of 56 cents is reached. In addition to the above scales the examiners also propose a differential scale to be added to the rates on traffic to points in the Texas differential territory which is somewhat higher than the present differential scale. Briefs of exception to the report proposed by the examiners are due in Washington on March 10, replies to such briefs on April 1 and oral argument at Washington has been set for April 9.

The decision of the commission in these proceedings will be perhaps the most important ever rendered in the history of that body, to which a close second will be their final determination of issues now before them in the so-called Investigation and Suspension Docket No. 3140, involving present and future rates on iron and steel pipe from the manufacturing and shipping points in the East, Central, South and elsewhere to all points in the Southwestern states. This proceeding came as a result of the publication by rail lines, of rates prescribed by the commission for the future in the well known Consolidated Southwestern Commodity Rate Investigation, which were found reasonable for application to iron and steel pipe as well as various other articles of iron and steel manufacture. The attempted establishment of the prescribed basis brought forth wide-spread protest. The commission suspended the rates and conducted a series of hearings. The Southwestern section, because of its importance as an oil producing section, leading every other section in the country, naturally was the most vitally affected and for the purpose of presenting a united plan of contest against the rates, the receivers and consumers combined into complaining interest known as the "Southwestern Consumers Committee"; the manufacturers similarly cooperated in these proceedings under a committee known as the "Manufacturers Committee" and the rail carriers of the different sections appeared and treated of their individual sectional requirements. It is well known that the suspended rates affect the bulk of the total movement of iron and steel pipe in the entire country, the Southwest being the largest purchaser and consumer in the country, due to the magnitude of the oil operations in this section, in which the purchase, shipment and consumption of

## AVERAGE DISTANCES, CURRENT AND SUSPENDED RATES, FROM DEFINED TERRITORIES TO THE SOUTHWEST

| To Texas<br>From— | 1<br>No. of stations Used | 2<br>Average Distance | 3<br>Average of Current Rates | 4<br>Average of Suspended Rates |
|---|---|---|---|---|
| 1—Chicago, Ill. | 42 | 1102 | 74.7c | 89.3c |
| 2—Lorain, Ohio | 42 | 1366 | 90.0 | 99.4 |
| 3—Memphis, Tenn. | 42 | 719.4 | 59.1 | 71.5 |
| 5—Pittsburgh, Pa. | 42 | 1470 | 94.9 | 104.6 |
| 6—St. Louis, Mo. | 42 | 853 | 65.8 | 78.0 |
| 7—Youngstown, Ohio | 42 | 1400 | 91.5 | 101.0 |
| To Oklahoma— | | | | |
| 1—Chicago, Ill. | 24 | 777 | 64.3 | 71.4 |
| 2—Lorain, Ohio | 24 | 1035 | 83.3 | 82.3 |
| 3—Memphis, Tenn. | 24 | 505 | 56.0 | 60.1 |
| 5—Pittsburgh, Pa. | 24 | 1144 | 87.8 | 87.6 |
| 6—St. Louis, Mo. | 24 | 538 | 56.2 | 60.4 |
| 7—Youngstown, Ohio | 24 | 1116 | 85.5 | 83.8 |
| To Kansas— | | | | |
| 1—Chicago, Ill. | 22 | 636 | 57.7 | 61.3 |
| 2—Lorain, Ohio | 22 | 937 | 82.3 | 81.6 |
| 3—Memphis, Tenn. | 22 | 553 | 62.9 | 63.5 |
| 5—Pittsburgh, Pa. | 22 | 1061 | 86.7 | 87.0 |
| 6—St. Louis, Mo. | 22 | 449 | 51.2 | 53.0 |
| 7—Youngstown, Ohio | 22 | 1022 | 85.3 | 83.3 |
| To Arkansas— | | | | |
| 1—Chicago, Ill. | 8 | 662 | 54.3 | 62.7 |
| 2—Lorain, Ohio | 8 | 877 | 71.1 | 72.2 |
| 3—Memphis, Tenn. | 8 | 200 | 34.5 | 35.7 |
| 4—Milwaukee, Wis. | 8 | 749 | 54.3 | 65.7 |
| 5—Pittsburgh, Pa. | 8 | 970 | 76.1 | 77.2 |
| 6—St. Louis, Mo. | 8 | 380 | 46.4 | 49.8 |
| To Louisiana— | | | | |
| 1—Chicago, Ill. | 5 | 885 | 65.8 | 75.8 |
| 2—Lorain, Ohio | 5 | 1106 | 80.2 | 85.4 |
| 3—Memphis, Tenn. | 5 | 354 | 46.4 | 49.4 |
| 4—Milwaukee, Wis. | 5 | 970 | 65.8 | 78.6 |
| 5—Pittsburgh, Pa. | 5 | 1159 | 83.8 | 89.6 |
| 6—St. Louis, Mo. | 5 | 609 | 57.8 | 63.4 |

## TABLE SHOWING INDICATED GROWTH IN THE CONSUMPTION OF STEEL PIPE IN TEXAS BASED ON ESTIMATED TONNAGE OF CASING USED IN DRILLING FOR OIL AND GAS

| Year | Total Carloads (70,000 lbs. Loading) | Daily Average Carloads | Wells Completed (Oil, Gas & Dry Holes) | Average No. of Carloads Per Well Completed |
|---|---|---|---|---|
| 1922 | 8,838.0 | 24.21 | 4428 | 2.00 |
| 1923 | 9,106.0 | 24.95 | 4935 | 1.85 |
| 1924 | 7,941.5 | 21.70 | 4552 | 1.75 |
| 1925 | 10.859.0 | 29.75 | 6292 | 1.73 |
| 1926 | 15,995.0 | 43.82 | 8958 | 1.79 |
| 1927 | 14,728.0 | 40.35 | 7385 | 1.99 |
| 1928 | 14,997.0 | 40.98 | 7612 | 1.97 |

### ESTIMATED DATA

| | |
|---|---|
| Casing Used in Average Well in Panhandle Texas | 4.0 Carloads |
| Casing Used in Average Well in West Texas | 2.5 Carloads |
| Casing Used in Average Well in North Central Texas | 1.0 Carloads |
| Casing Used in Average Well in East Central Texas | 2.0 Carloads |
| Casing Used in Average Well in East Texas | 3.0 Carloads |
| Casing Used in Average Well in Southwest Texas | 1.5 Carloads |
| Casing Used in Average Well in Coastal Texas | 4.0 Carloads |

## AVERAGE WEIGHTS PER MILE OF STEEL PIPE USED IN OIL AND GAS PIPE LINE CONSTRUCTION

| Size of Pipe Inches | Weight Per Foot Pounds | Weight Per Mile Pounds | Tons Per Mile 2000 Pounds | Carloads Per Mile 70,000 lb. Car |
|---|---|---|---|---|
| 2 | 3.7 | 19,536.0 | 9.768 | .279 |
| 3 | 7.6 | 40,128.0 | 20.064 | .573 |
| 4 | 10.8 | 57,024.0 | 28.512 | .815 |
| 6 | 19.0 | 100,320.0 | 50.160 | 1.433 |
| 8 | 24.7 | 130,416.0 | 65.208 | 1.863 |
| 10 | 34.0 | 179,520.0 | 89.760 | 2.565 |
| 12 | 45.0 | 237,600.0 | 118.800 | 3.394 |
| 14 | 57.0 | 300,960.0 | 150.480 | 4.299 |
| 16 | 65.0 | 343,200.0 | 171.600 | 4.903 |
| 18 (gas) | 80.0 | 422,400.0 | 211.200 | 6.034 |
| 20 (gas) | 85.0 | 448,800.0 | 224.400 | 6.411 |
| 22 (gas) | 90.0 | 475,200.0 | 237.600 | 6.789 |

NOTE: Average carloading of all pipe as reported by the Bureau of Statistics of the Interstate Commerce Commission for 1927 and 1928 was 33.81 and 36.66 short tons respectively. Using these figures as a basis, it was estimated that, for the years 1922-29, and for all sizes of pipe, an average figure of 35 short tons or 70,000 pounds per carload was equitable and approximately the average loading.

pipe enters as one of the largest and most important factors. The present system of rates is one of long standing and is generally on a group basis, while that prescribed by the commission and published by the rail lines, was a blow at this method of rate making and would have resulted in practically a distance scale, except for very small groupings at the destination ends on through traffic from the manufacturing points. Many different interesting exhibits were presented at these hearings, in which facts, figures and statistics were presented, some of which, disclose statistics never before publicly exhibited. A few of the more interesting and important are partly given in the accompanying tables, which it will be noted, deal with the volume, of movement from the latest available records; tonnage per mile, of oil and gas line construction; miles of line constructed in given periods and estimated tons of pipe used, per mile and in the aggregate and others, which should prove interesting to the layman, being compiled in a manner, requiring no technical traffic knowledge to understand:

## TABLE SHOWING ESTIMATED TONNAGE OF CASING USED IN DRILLING FOR OIL AND GAS IN THE STATE OF TEXAS

**(Estimated by Producing Districts)**

| | Panhandle Texas | | West Texas | | N. Central Texas | | E. Central Texas | |
|---|---|---|---|---|---|---|---|---|
| Year | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Carloads of Steel Pipe |
| 1922 | 4 | 16.0 | 13 | 32.5 | 2117 | 2117.0 | 918 | 1836.0 |
| 1923 | 13 | 52.0 | 25 | 62.5 | 2651 | 2651.0 | 861 | 1722.0 |
| 1924 | 35 | 140.0 | 75 | 187.5 | 2721 | 2721.0 | 471 | 942.0 |
| 1925 | 69 | 276.0 | 148 | 370.0 | 3672 | 3672.0 | 762 | 1524.0 |
| 1926 | 832 | 3328.0 | 519 | 1297.5 | 5687 | 5687.0 | 237 | 474.0 |
| 1927 | 795 | 3180.0 | 984 | 2460.0 | 3747 | 3747.0 | 213 | 426.0 |
| 1928 | 392 | 1568.0 | 1271 | 3177.5 | 3897 | 3897.0 | 117 | 234.0 |

| | East Texas | | Southwest Texas | | Coastal Texas | | —Total Texas— | | |
|---|---|---|---|---|---|---|---|---|---|
| Year | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Carloads of Steel Pipe | Wells Drilled | Total Carloads of Steel Pipe | Daily Avg. Carloads |
| 1922 | 5 | 15.0 | 265 | 397.5 | 1106 | 4424.0 | 4428 | 8838.0 | 24.21 |
| 1923 | 24 | 72.0 | 359 | 538.5 | 1002 | 4008.0 | 4935 | 9106.0 | 24.95 |
| 1924 | 19 | 57.0 | 412 | 618.0 | 819 | 3276.0 | 4552 | 7941.5 | 21.70 |
| 1925 | 17 | 51.0 | 612 | 918.0 | 1012 | 4048.0 | 6292 | 10,859.0 | 29.75 |
| 1926 | 16 | 48.0 | 603 | 904.5 | 1064 | 4256.0 | 8958 | 15,995.0 | 43.82 |
| 1927 | 49 | 147.0 | 648 | 972.0 | 949 | 3796.0 | 7385 | 14,728.0 | 40.35 |
| 1928 | 132 | 396.0 | 595 | 892.5 | 1208 | 4832.0 | 7612 | 14,997.0 | 40.98 |

## TABLE SHOWING TONNAGE OF STEEL PIPE USED IN CONSTRUCTION OF OIL PIPE LINES IN TEXAS FROM 1922 TO 1928 INCLUSIVE

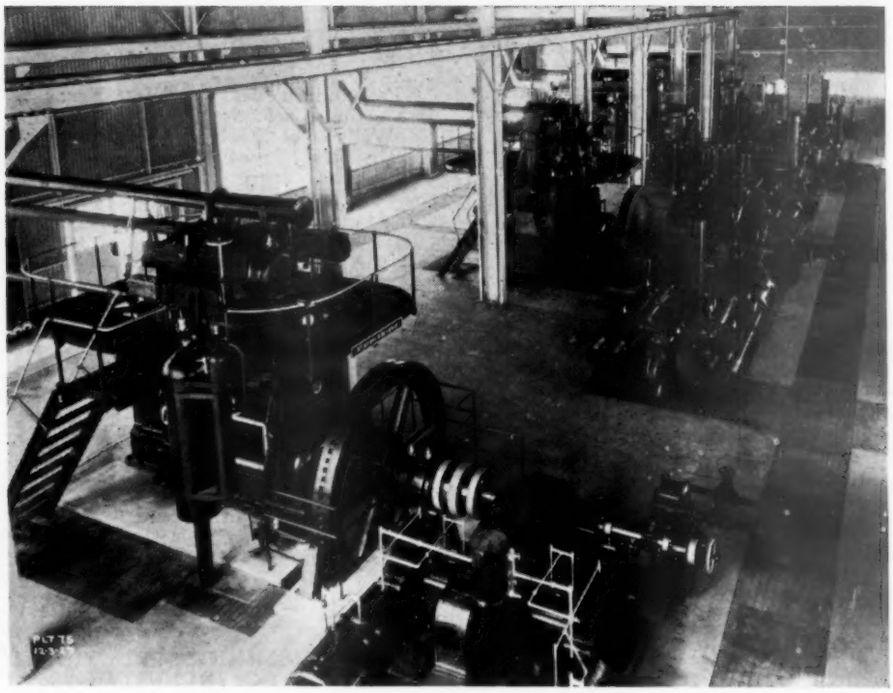
**(Data Estimated to be 75% Complete for Trunk Lines)**

| Year | | 2-inch | 3-inch | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch | 16-inch | Total Construction | Equivalent Daily Average Construction |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1922 | Miles of Line | 237.08 | 85.77 | 339.36 | 253.73 | 625.14 | 79.64 | 1.09 | .01 | 1,621.82 | 4.44 |
| | Tons of Pipe | 2315.80 | 1720.89 | 9,675.83 | 12,727.10 | 40,764.13 | 7,148.49 | 129.49 | 1.72 | 74,483.45 | 204.06 |
| | Carloads of Pipe | 66.15 | 49.15 | 276.58 | 363.60 | 1,164.64 | 204.28 | 3.70 | .05 | 2,128.15 | 5.83 |
| 1923 | Miles of Line | 269.69 | 105.45 | 361.61 | 327.45 | 435.11 | 179.84 | 22.94 | .06 | 1,702.15 | 4.66 |
| | Tons of Pipe | 2634.33 | 2115.75 | 10,310.22 | 16,424.89 | 28,372.65 | 16,142.44 | 2,725.27 | 10.30 | 78,735.85 | 215.71 |
| | Carloads of Pipe | 75.24 | 60.42 | 294.71 | 469.24 | 810.61 | 461.29 | 77.86 | .29 | 2,249.66 | 6.16 |
| 1924 | Miles of Line | 318.14 | 115.74 | 461.92 | 174.77 | 533.84 | 3.30 | 76.06 | 1.61 | 1,685.38 | 4.60 |
| | Tons of Pipe | 3107.58 | 2322.21 | 13,170.26 | 8,766.46 | 34,810.64 | 296.21 | 9,035.93 | 276.28 | 71,785.57 | 196.14 |
| | Carloads of Pipe | 88.76 | 66.32 | 376.46 | 250.45 | 994.54 | 8.46 | 258.15 | 7.89 | 2,051.03 | 5.60 |
| 1925 | Miles of Line | 418.54 | 135.44 | 569.05 | 340.81 | 803.17 | 2.50 | 14.45 | .02 | 2,283.98 | 6.26 |
| | Tons of Pipe | 4088.30 | 2717.47 | 16,224.75 | 17,095.03 | 52,373.11 | 224.40 | 1,716.66 | 3.43 | 94,443.15 | 258.75 |
| | Carloads of Pipe | 116.77 | 77.61 | 463.78 | 488.38 | 1,496.31 | 6.41 | 49.04 | .10 | 2,698.40 | 7.39 |
| 1926 | Miles of Line | 541.01 | 197.86 | 617.04 | 287.84 | 934.37 | 143.33 | 48.15 | .... | 2,769.60 | 7.59 |
| | Tons of Pipe | 5284.59 | 3969.86 | 17,593.04 | 14,438.05 | 60,928.40 | 12,865.30 | 5,720.22 | .... | 120,799.46 | 330.96 |
| | Carloads of Pipe | 150.94 | 113.37 | 502.89 | 412.47 | 1,740.73 | 367.64 | 163.42 | .... | 3,451.46 | 9.46 |
| 1927 | Miles of Line | 997.04 | 208.51 | 795.42 | 592.69 | 985.78 | 669.73 | 370.19 | .02 | 4,619.38 | 12.66 |
| | Tons of Pipe | 9739.09 | 4183.54 | 22,679.02 | 29,729.33 | 64,280.74 | 60,114.96 | 43,978.57 | 3.43 | 234,708.68 | 643.04 |
| | Carloads of Pipe | 278.17 | 119.48 | 648.27 | 849.32 | 1,836.51 | 1,717.86 | 1,256.42 | .10 | 6,706.13 | 18.37 |
| 1928 | Miles of Line | 871.99 | 255.11 | 1,043.05 | 836.03 | 1,348.53 | 1,896.53 | 551.08 | .01 | 6,802.33 | 18.59 |
| | Tons of Pipe | 8517.60 | 5118.53 | 29,739.44 | 41,935.26 | 87,934.94 | 170,232.53 | 65,468.30 | 1.72 | 408,948.32 | 1117.35 |
| | Carloads of Pipe | 243.29 | 146.18 | 850.09 | 1,198.03 | 2,512.31 | 4,864.60 | 1,870.37 | .05 | 11,684.92 | 31.93 |

## TABLE SHOWING TONNAGE OF STEEL PIPE USED IN CONSTRUCTION OF GAS PIPE LINES IN TEXAS FROM 1922 TO 1928 INCLUSIVE

**(Data Estimated to be 75% Complete for Trunk Lines)**

| Year | | 2-inch | 3-inch | 4-inch | 6-inch | 8-inch | 10-inch | 12-inch | 14-inch | 16-inch | 18-inch | 20-inch | Total Construction | Equivalent Daily Average Construction |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1922 | Miles of Line | 7.60 | 3.95 | 13.72 | 18.35 | 22.13 | 9.34 | 4.91 | ..... | ..... | ..... | ..... | 80.00 | .22 |
| | Tons of Pipe | 74.24 | 79.25 | 391.18 | 920.44 | 1443.05 | 838.36 | 583.31 | ..... | ..... | ..... | ..... | 4,329.83 | 11.86 |
| | Carloads of Pipe | 2.12 | 2.26 | 11.18 | 26.30 | 41.23 | 23.96 | 16.66 | ..... | ..... | ..... | ..... | 123.71 | .34 |
| 1923 | Miles of Line | .... | .... | 2.06 | 41.93 | 9.05 | .87 | ..... | ..... | 10.84 | 13.59 | ..... | 78.34 | .21 |
| | Tons of Pipe | .... | .... | 58.73 | 2,103.21 | 590.13 | 78.09 | ..... | ..... | 1,860.14 | 2,870.21 | ..... | 7,560.51 | 20.71 |
| | Carloads of Pipe | .... | .... | 1.68 | 60.09 | 16.86 | 2.23 | ..... | ..... | 53.15 | 82.00 | ..... | 216.01 | .59 |
| 1924 | Miles of Line | .09 | 1.04 | 22.68 | 32.86 | 32.73 | ..... | 52.41 | 30.00 | 100.87 | 70.66 | ..... | 343.34 | .94 |
| | Tons of Pipe | .88 | 20.87 | 646.65 | 1,648.26 | 2134.26 | ..... | 6,226.31 | 4514.40 | 17,309.29 | 14,923.39 | ..... | 47,424.31 | 129.57 |
| | Carloads of Pipe | .03 | .60 | 18.48 | 47.09 | 60.98 | ..... | 177.88 | 128.97 | 494.57 | 426.36 | ..... | 1,354.96 | 3.70 |
| 1925 | Miles of Line | 28.37 | ..... | 35.66 | 16.12 | 47.44 | 36.65 | 6.57 | ..... | ..... | ..... | ..... | 170.81 | .47 |
| | Tons of Pipe | 277.12 | ..... | 1016.74 | 808.58 | 3093.47 | 3,289.70 | 780.52 | ..... | ..... | ..... | ..... | 9,266.13 | 25.39 |
| | Carloads of Pipe | 7.92 | ..... | 29.06 | 23.10 | 88.38 | 94.01 | 22.30 | ..... | ..... | ..... | ..... | 264.77 | .73 |
| 1926 | Miles of Line | 2.41 | .65 | 35.44 | 51.11 | 21.33 | 107.55 | 90.63 | 60.00 | 204.12 | 212.32 | ..... | 785.56 | 2.15 |
| | Tons of Pipe | 23.54 | 13.04 | 1010.47 | 2,563.68 | 1390.89 | 9,653.69 | 10,766.84 | 9028.80 | 35,026.99 | 44,841.98 | ..... | 114,319.92 | 313.21 |
| | Carloads of Pipe | .67 | .37 | 28.88 | 73.24 | 39.74 | 275.87 | 307.60 | 257.94 | 1,000.80 | 1,281.14 | ..... | 3,266.25 | 8.95 |
| 1927 | Miles of Line | 53.23 | 113.54 | 140.21 | 202.07 | 145.20 | 222.15 | 124.05 | 25.86 | 272.57 | 62.36 | ..... | 1,361.24 | 3.73 |
| | Tons of Pipe | 519.95 | 2278.07 | 3997,67 | 10,135.83 | 9468.20 | 19,940.18 | 14,737.14 | 3891.41 | 46,773.01 | 13,170.43 | ..... | 124,911.89 | 342.22 |
| | Carloans of Pipe | 14.85 | 65.06 | 114.27 | 289.57 | 270.51 | 569.81 | 421.03 | 111.17 | 1,336.41 | 376.28 | ..... | 3,568.96 | 9.78 |
| 1928 | Miles of Line | 37.75 | 97.54 | 117.54 | 284.55 | 86.54 | 33.78 | 127.54 | ..... | 191.24 | 8.41 | 87.00 | 1,071.89 | 2.93 |
| | Tons of Pipe | 368.74 | 1957.04 | 3351.30 | 14,273.03 | 5643.10 | 3,032.09 | 15,151.75 | ..... | 32,816.78 | 1,776.19 | 19,522.80 | 97,892.82 | 267.47 |
| | Carloads of Pipe | 10.53 | 55.89 | 95.80 | 407.76 | 161.22 | 86.65 | 432.87 | ..... | 937.65 | 50.75 | 557.76 | 2,796.88 | 7.64 |



*Interior of pump room at Junction oil engine station, overlooking two 200 horsepower and two 400 horsepower McIntosh & Seymour vertical Diesel engines direct connected with two 5½x18 Worthington horizontal duplex pumps and two 6x24 Goulds horizontal triplex pumps*

(Continued from page 64)

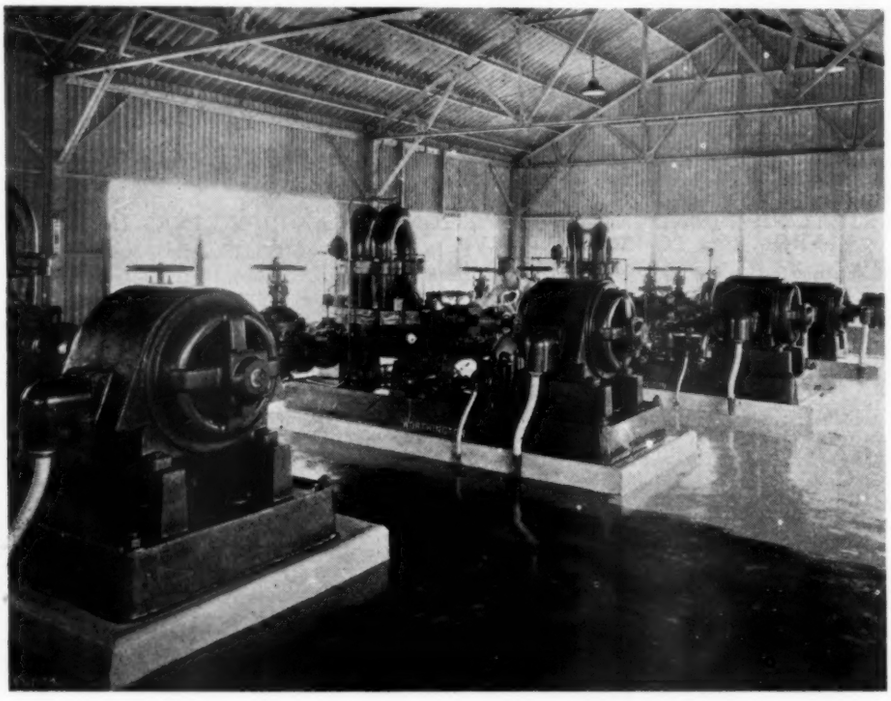
ed from the surface down because of hard rock.

The surface elevation at Jal, New Mexico, on the northwestern end of the line is 3070 feet, while Houston is around 55 feet above the sea. Between those points there are 13 main line stations. Nine stations are motor driven, each being equipped with centrifugal pumping units and General Electric motors; three stations are Diesel oil engine driven; and the remaining one, Jal Station, has Miller gas engines and Goulds reciprocating pumps.

The three Diesel engine stations, known as the Iraan, Junction, and Rosanky stations, have the same equipment, as follows: two 400 horsepower and two 200 horsepower McIntosh-Seymour Diesel engines, and two 20,000-barrel capacity and two 10,000-barrel capacity Goulds reciprocating pumps.

Six of the motor driven stations, Ozona, Sonora, Segovia, Fredericksburg, San Marcos, New Ulm and Brookshire, are each equipped with a quartet of Worthington centrifugal pumps, driven by three 400 horsepower and one 80 horsepower General Electric motors. At the Wink station are four Byron-Jackson centrifugal pumps driven by General Electric motors, and the Crane station has three Worthington centrifugal pumps connected to three 400 horsepower General Electric motors.

Survey for this trunk line of The Texas Pipe Line Company was started June 20, 1928, and completed August 15, 1928. By July of 1929 the line was in operation, and within 10 days after main line stations were completed there had been a maximum movement of over 50,000 barrels daily through the system.



*Interior of pump room at New Ulm motor driven station, showing three 300 horsepower General Electric induction motors direct connected to six-inch Worthington centrifugal pumps and variable speed motor and pump in background.*

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*Bend in line between Denver and Fort Collins. Photo courtesy National Tube Company.*

# Developments in Pipe Line Welding Practice and Equipment

By H. L. KAUFFMAN
*Consulting Engineer, Denver, Colorado*

THE past few years have been marked by the rapidly growing use of welded pipe lines instead of the screwed joint type of line. Welding of oil pipe lines was first started in 1919-20, in somewhat of an experimental way, but since that time many new and important developments have taken place both in welding practice and the equipment used. To touch the "high spots" of those developments, especially those that have been introduced during the past year or two, is the purpose of this article.

But first, mention should be made of the changes taking place in the kinds of pipe being used. For years it had been the general practice to use lap-welded pipe for both trunk and gathering lines. But in 1927-28 seamless pipe was used on much new work, and numerous advantages are claimed for it over the lap-welded product. With seamless pipe pumping stations are spaced farther apart, the pipe being given a higher operating pressure, which enables more oil to be pumped through a line of a given diameter where the distance between stations is not changed—either of which is a decided pipe line economy. Then, not long after seamless pipe had been introduced, pipe with electrically welded seams was placed on the market. This pipe is made for use with welded joints, and is characterized by having a special bell on one end of the pipe and a shoulder at a certain distance from the other end to permit the insertion of one end of the pipe into the bell of the other, allowing a distance between the bell and the face of the shoulder to permit welding. In the manufacture of this particular product, flat plates are first rolled into the shape of a tube—after which the pipe is electrically welded along its longitudinal seam.

### The First Welded Pipe Lines

In 1910 the first attempts were made to join pipe by autogenous welding, but it was not until 1915 that the first sizable welded gas line was laid. This line was put down to serve the San Francisco fair, and was oxy-acetylene welded. In 1919 and 1920 welding entered the oil pipe line field, when broken screwed coupling lines were repaired by welding. The first welded oil-carrying line was started in December, 1920, by Prairie Pipe Line Company under the supervision of N. E. Wagner, and was laid between Bartlesville and Cherokee Station, near Ramona, Oklahoma, a distance of 15 miles. The line was eight-inch pipe, and was oxy-acetylene welded throughout.

In July and August, 1921, this same company laid another eight-inch welded line, about 14 miles in length, between Meeker and Davenport, Oklahoma. This was followed by another eight-inch welded oil-carrying line from Mexia to Hensley, Texas, a distance of about 140 miles. Work on this first major welded trunk line was started in December, 1921, and the line was completed in the first half of 1922. Since that time developments in welding practice and equipment have been rapid.

In the fall of 1927 the first electric arc welded pipe line was laid between Lamkin and Hodge, Louisiana. This was a seven-inch line, 40 miles long, for the transportation of gas. Until September 1, 1928, only relatively short lines were electric welded, but during the 12-month period that followed over 3000 miles of electric arc welded oil and gas lines had either been completed or were in process of construction.

### Electric Arc Welding Not New

Electric arc welding has come into favor largely because the method is more rapid than other welding methods. However, many field men are of the opinion that the idea is new—a thing that is far from the truth. As a matter of fact, the art of electric welding dates back to 1880 when two Russians, Benardoz and Demeretin, experimented with the carbon arc for

welding purposes; and Benardoz obtained a basic patent on his invention in Russia, in 1887. The metallic arc electrode was patented in the United States in 1889 by a Detroit man by the name of Coffin.

Electric arc welding in its essential features, is nothing more than the utilization of the intense heat of an electric arc to fuse two pieces of metal, so that they flow together and combine to form a weld. In practice, one pole of a direct current generator (alternating current can also be used) is connected to the piece to be welded, while the other pole is connected to an electrode held (by means of a suitably insulated holder) in the hands of the operator. The electrode is brought into contact with the piece to be welded and is then drawn slightly away from it; whereupon the current leaps from one pole to the other to form an arc, thus supplying the heat necessary to make a weld. In pipe line work a metal electrode, one-eighth to one-quarter inch in diameter and of a suitable analysis to combine with the metal of the piece to be welded, is used. The electrode itself melts and furnishes the necessary new metal for filling in the weld. By this method the heat is confined to a comparatively small area, and the metal can be deposited with great accuracy.

Metallic arc welding has been in use in the United States since about 1910, but was not very favorably accepted for four or five years because of the difficulty in getting suitable welding wire. Carbon electrode welding on a large scale was introduced in this country about 1902 by The Baldwin Locomotive Works. The metallic electric arc really received its first great impetus during the world war when the United States set about to repair the machinery of interned German ships in American ports, which machinery had been put out of commission by the German seamen when they knew they were to be interned. At that time the welding committee of the Emergency Fleet Corporation was formed to investigate all forms of welding applicable to the repair and building of ships, and it was the personnel of this committee which, after the war, was responsible for the organization of the American Welding Society.

### Original Objections to Arc Welded Pipe Lines

Like everything else that is new or radical in nature, the development of electric welding for pipe lines has not all been "rosy." There were many difficulties to be solved, and there are still problems to be "ironed out." The original faults, many of which were justified, of this form of welding may be summarized as follows:

1. Excessive cost.
2. Inconsistent quality of welding rod and unsuitable equipment.
3. Welds were of low tensile strength, were too brittle and too porous.
4. Joint designs and field welding operations were unsatisfactory.
5. Work done by welders was of poor quality.

"Excessive cost" is a complaint met wherever a process or product must pass through a development stage. Consequently, it must be recognized that electric arc welded lines now being laid cost much less than those laid two to two and a half years ago when equipment was hand-built by expensive mechanics and standardized equipment was not yet available. Electric welding equipment is still comparatively expensive, but, nevertheless, electric welding has been found to be cheaper than any other methods of construction on lines of small diameter, while for lines of larger diameter the costs are approximately the same.

As indicated previously in this article the difficulty in getting suitable welding rods has always, until the past year or so, hindered the development of electric welding. Now, however, due largely to competitive conditions, quality is being maintained by careful testing. Further mention of developments in welding rods will be made later in this article. Welding equipment is now made so that it can be moved wherever motor trucks or tractors can go. Power units and generators are also lighter in weight than were those first in use.

Low tensile strength, excessive brittleness, and porous welds were common troubles on the earlier arc welded lines. Improvements in welding rods, in welding equipment and welding operations have resulted in the elimination, to a marked degree, of all these complaints. It is very common at present for welded joints actually to have a weld strength greater than the pipe stock, and welding companies are now prepared and willing to guarantee a minimum tensile strength at the weld of 80 per cent of that of the pipe itself. Brittleness is now reduced to a minimum by buying materials on close specifications, and carefully inspecting and testing the work of the individual welders. Inexperienced welders, plus unsuitable welding rods and performing the welding operation at heats too low for the satisfactory deposition of the material, caused much trouble at first because of the porosity of the electric welded joint. Fortunately, this trouble is no longer common due to welding rods now being designed to prevent porosity and pinholes by reduction of gases in the molten weld, while the temperatures of deposition can now be so controlled as to reduce the possibility of the formation of crystals in the completed weld. Now, too, by making the weld the positive pole of the arc, the top of the molten weld is made hotter than the bottom, in consequence of which the included gases are able better to escape.

Space prohibits our going into a discussions of the improvements in joint designs and in field practice that have added materially to the success of the process. An article, "Arc Welded Line Stands Rigid Tests; Process Economical," by J. F. Lincoln, in the April 26, 1929, issue of The OIL WEEKLY, gives considerable detailed information on typical practice when laying an electric welded line. Another valuable discussion of this subject, for the reader who wants more complete information, was the paper, "Electric Welding of Field Joints of Oil and Gas Pipe Lines," by Harold C. Price, General Manager, Welding Engineering Company, presented at Tulsa, Oklahoma, at the October, 1929, meeting of the American Institute of Mining and Metallurgical Engineers. This paper is now in printed form as Technical Publication No. 251 of the Society.

### Better Welders Now Available

The welder, whether he is a specialist in oxy-acetylene welding or electric arc welding, is a better qualified workman than was the average type available several years ago. This has been largely due to the special training being given men nowadays, by pipe and equipment manufacturers, for pipe line welding work; and to the improvements that have been made in methods of testing the welds made by the individual worker. Welding is a highly specialized trade and necessitates careful workmanship. When unqualified or careless men know that their work is being constantly checked, it naturally results in the "weeding out" of the inefficient welder—with the result that better welders are now available than ever before. And better welders, no matter what the particular type of welding employed, means better welded joints.

In present electric welded line construction, the work is generally divided into three operations

1. "Line up" and tacking.
2. Roll welding or "firing line."
3. Tie-in or "bell holing."

Where the line is being laid for the pipe line owner by a welding contractor, it is now common practice for both the owner and the contractor to conduct a rigid inspection of the work. The work done by both the "firing line" and the "tie-in" gangs must receive the OK of an inspector, and generally each weld is inspected as it is made. "Coupons," which are merely slices of the welded joint, are cut periodically with a milling machine from welds completed by each welder. These coupons are about one-quarter inch thick, and though they cannot be used for strength tests, they do show a cross-section of the weld and are an indication of its size and penetration.

From time to time complete welds are cut out of the line and tested for tensile strength. Whenever any welds do not measure up to proper specifications, they are immediately marked and re-welded. Where a bell and spigot joint is cut out for any reason, it is replaced by a split sleeve. In doing this the pipe is first welded with an ordinary butt weld, the sleeve is then slipped over this weld, and the split of the sleeve is welded; both ends of the sleeve are then welded to the pipe.

It is this constant inspecting and testing of the work each welder does

that is adding to the effectiveness of welded oil and gas pipe lines.

**Material and Equipment Developments**

Better electric welding is also now possible because of our increased knowledge of the importance of the welding current in this class of work. Metallic arc welding had not progressed very far before it was recognized that the source of the welding current should have a higher potential at the start, say from 60 to 90 volts, than is necessary a little later in the welding operation; and that some means had to be provided to reduce the potential to about 20 volts when once the arc had been struck (about 30 volts in the case of the carbon arc). This higher voltage at first is made necessary by reason of the natural thin film of metallic oxide that exists even on apparently very clean surfaces.

This reduction is now accomplished in either of two ways: By dissipating the excess voltage in a resistance which is inserted in the welding line. This is known as the constant-voltage or constant-potential type of equipment. The second method consists in the use of a specially designed generator which will automatically lower its own voltage as soon as the arc is struck, and which will also instantly restore the original voltage when the arc is broken. This is known as the variable-voltage type of equipment, and represents the type commonly used in the electric welding of pipe lines.

Constant-voltage equipment, because of its relatively large size and weight, is generally installed in a permanent location. It is usually applicable for use under conditions where several welders are working from the same source of power supply, where its advantage lies in the fact that the total capacity need not be the exact sum of the welding currents to be used by each operator—since they will seldom all be welding at the same moment. As a result, the entire equipment for generating the welding current can be concentrated in one welding generator set. When such a set is used, each welding line is provided with its own reactor for stabilizing the arc and with its own resistance for voltage reduction, so that the power consumed at any one time by resistance depends only upon the number of men welding at that particular moment.

In the variable-voltage or single-operator type of equipment, a separate welding generator is provided for each individual operator. The commonly recognized advantages of this type are its portability (a thing that is essential in pipe line construction work) and flexibility of independent control.

With the foregoing clearly in mind let us see some of the more specific developments that have taken place during the past year in pipe line welding materials and equipment.

In electric arc welding the Lincoln Electric Company (manufacturers of automatic "stable-arc" welders using the "electronic tornado" process of carbon welding) have been one of the pioneers—for it was this company that sponsored the first arc welded line which was completed in Louisiana in December, 1927. This company, during the forepart of 1929, had one main type of equipment specially adapted for pipe line welding: This was a welding generator of 300 ampere N. E. M. A. rating with current range of 75 to 400 amperes, direct connected by a large flexible coupling to a Buda HS-6 gasoline engine, six-cylinder, four-cycle, heavy-duty type, the whole arranged and designed for ready mounting on any suitable kind of transportation equipment. A smaller welding outfit especially designed for oil-field service was also available.

In the past year, however, the company has made a number of marked improvements in Lincoln electric power driven welders, unification of the controls of both motor and generator being one of the outstanding features. The working mechanism of all controls is now contained in a ventilated enclosed steel cabinet with hand regulators and switches mounted on a panel which forms a side of the cabinet. The control panel contains rheostat regulator, diverter switch, safety starter switch, volt-ammeter and wing nut terminals for cables. This unified control is said greatly to increase the simplicity of the operation of the welding machine. The control cabinet in this new type of equipment is mounted directly over the motor generator for easy access by the welding operator. This also permits the removal of the motor generator armature without disturbing any other parts.

The use of a combined voltmeter and ammeter, known as a volt-ammeter, makes possible the reading of voltage and amperage on one dial and eliminates the use of the separate delicate ammeter, which heretofore on a Lincoln welder is said to have received excessive wear because the large output kept the ammeter jammed against the high limit pin on the dial. Terminals for the lead cables are now equipped with winged nuts, which is reported to make quick and easy connections possible and eliminates the necessity of a switch for reversing polarity. A special type of safety push-button switch is incorporated in the control panel for starting and stopping of the welding machine. Enclosed wiring of all operating controls, as well as a metal-backed rheostat, are the result of the previously mentioned unified control cabinet. By mounting this cabinet over the motor generator, it was possible to use a smaller chassis frame, and this therefore gives a smaller turning radius on the portable models used in pipe line work.

In December, 1929, the Lincoln Electric Company placed on the market an automatic idling or throttle control device for regulating the speed of the engine in their welders of the gasoline-engine driven type. The new device automatically increases the speed of the engine from normal idling speed to the proper speed for welding service whenever the arc is struck. When the welding is discontinued, the device automatically reduces the speed of the engine to normal idling speed. The operating mechanism of the device consists principally of a small metal bellows and an electric magnet. When the arc is struck the armature of the electric magnet opens a relief valve in the bellows causing them to inflate which, in turn, allows a coil spring to open the engine throttle. When welding operation ceases the bellows are deflated by the suction of the engine intake, thus causing the closing of the engine throttle to idling position. The idling device is provided with a control level which may be set for automatic throttle control, for continuous idling speed or for governed speed. The device is so designed that a momentary interruption in welding will not cause a reduction in the speed of the engine. The main advantage in the use of this new automatic idler is a material lowering of fuel consumption.

During the past year the U.S.L. Battery Corporation also made a number of electrical and mechanical improvements in its line of electric arc welders, which may be summarized as follows: Installation of a large fan protected by a grating at the pulley end of the generator, which fan is said to increase the capacity and lower the normal operating temperature of the welder. Use of a larger commutator is reported to have resulted in increased capacity, better commutation and a quieter machine. The number of brushes has also been increased, there now being 16 brushes on this company's 300-ampere welder and 12 brushes on their 200-ampere machine. The coupling between the welder and exciter shaft has been eliminated and the shaft is now in one continuous piece, with the exciter outboard bearing eliminated. Timken tapered roller bearings have been introduced, simplifying the shaft constructon and eliminating screw threads, keys, split nuts and set screws from the bearing mountings. Generators are all built independently of any consideration for the source of driving power, and couplings are designed so that electric motor, gasoline engine or other source of power may be used. The exciter has been re-designed for improved ventilation, while the consumption of power in the fields of the exciter is said to have been reduced about 50 per cent.

During the past year the General Electric Company replaced its four-cylinder engine-driven portable electric arc welding machine with a six-cylinder Buda engine, thereby securing greater capacity and increased steadiness of operation. Although the welding generator of the new machine has a current range of 90 to 375 amperes, there is included with the set a current-reducing resistor by means of which welding currents down to 25 amperes may be obtained. The generator is provided with a brush-shifting device which regulates the welding current by infinitely small gradations, and is ac-

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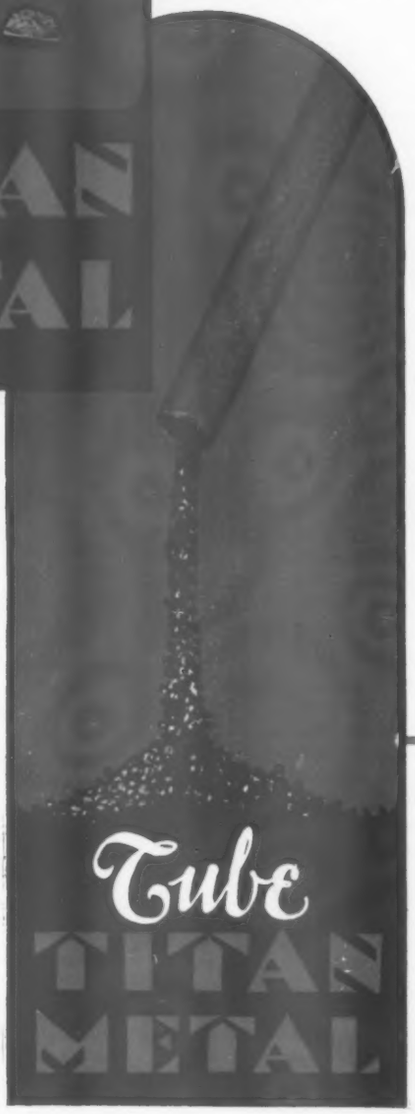


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complished simply by turning an external handle. A steady arc is maintained by a self-adjusting stabilizing reactor, which operates automatically. This automatic regulation is obtained by a specially designed magnetic circuit without any moving parts. Westinghouse Electric & Manufacturing Company also made some improvements in its portable electric arc welding machines during the past year.

Arc welders are now being mounted on tractors, a thing that—so far as the writer was able to learn—was not done prior to 1929. The extension frame in this new mounting is such that the tractor is simply set into a four-inch "I"-beam frame, while the front axle assembly is set ahead under the frame, thereby lengthening the wheel base. This construction is for the purpose of reinforcing the tractor and to give it balance, making it easier to steer with the added weight. The welder unit complete with the panel is mounted on this frame member ahead of the tractor and takes its drive from the power pulley at the side of the tractor by a belt. This gives a compact self-contained unit capable of moving about under its own power. Dual tires used in the rear give the unit described a road speed of 15 miles per hour. The Pontiac Tractor Company of Pontiac, Michigan, is the manufacturer.

Materials of which welding rods are composed are now under closer inspection than ever before. As a matter of fact, rods are designed at present for specific properties in the resultant weld. The composition of rods varies greatly, and this is most often a trade secret. However, it is known that they are being made of alloys that reduce the inclusion of gases, oxides, nitrides, and solid non-metallic substances; that many of them contain a flux to absorb impurities in a slag, which floats on top of the molten metal and is easily removed after the weld has cooled; and that they are given coatings to produce a neutral atmosphere around the molten weld metal. For certain conditions, welding rods are now being applied by means of the metallic arc process, by the use of reverse polarity, making the rod the positive electrode. Uniformity of quality is now obtainable in all welding rods, a statement that could not have been made several years ago, and assuming that the product is purchased from a reputable manufacturer who represents his goods in his advertising for what they really are.

"Stiffness" in welded lines is now eliminated by the use of an expansion joint, which is relatively long and flexible, that was introduced in 1928 by the A. O. Smith Corporation—though it was originally designed in 1925 by Fred M. Lege, Jr. This type of joint, because of its three wrinkles protruding above the pipe surfaces, is known in pipe-line parlance as a "wrinkly-belly" joint. National Tube Company also has introduced an improved double ring and bell joint that lessens the stiffness of welded lines.

**Oxy-Acetylene Welding Developments**

The writer has had no thought of emphasizing unduly the developments in electric arc welding to the exclusion of comments on the progress made in oxy-acetylene welding. However, interest and developments have been more pronounced in the case of arc welding, and, hence, so much space has been devoted to that phase of the subject of welding developments in the present article.

During 1929 the Oxweld Acetylene Company introduced a two-stage oxygen regulator, which was designed to eliminate fluctuation in working oxygen pressures. Stem-type valves were incorporated in the new regulator. The chief feature of the improved design is two-stage pressure reduction, which is accomplished through the medium of two independent sets of diaphragms, valves and springs. Another development by this same company was an improved type of generator designed especially for low-pressure welding. Pressure adjustment is made by means of a thumbscrew on the motor feed control. Fluctuation during normal operation is said to be less than one pound per square inch; under severe load the carbide feed is regulated to limit after-generation to a maximum increase of one pound per square inch. This permits operation of the generator close to the limit of 15 pounds per square inch without loss of gas through the relief valves when the blowpipes are turned off. Should both the motor brake and relief valves fail to function, the motor locks at about 18 pounds per square inch pressure. Should a broken line or leak of any kind cause the pressure to drop to zero during the operation, the motor stops and will not start except by hand. The feed valve cone can be raised to seal the hopper when the generator is being moved. The valve is also automatically raised, closing the hopper, every time the carbide filling door is opened.

A new safety regulator was introduced late in 1929 by the Victor Welding Equipment Company. This regulator is reported to control pressures as low as one-quarter of an ounce, and to reduce a full oxygen tank of 2000 pounds pressure down to a quarter ounce, thereby eliminating the necessity of constantly adjusting the needle valves at the torch. Its construction is such that the only part subject to wear may be replaced on the job without special tools or skill; the seat is reversible, and is exchangeable in one minute. Free motion of the seat is provided for with the seat self-aligning, because the seat holder and plunger are in double roller bearings. In use, high pressure gas from the tank enters a large circular equalizing chamber through two separate holes drilled at an angle. In this chamber these two streams meet, to eliminate friction on the regulator seat. The gas then enters a small circular chamber to pass over the seat, through the nozzle and center pin openings, against the balance pin centralizer into the low pressure diaphragm chamber. When the seat is resting against the nozzle, the flared end of the balance pin fills the nozzle opening, protecting the seat against flash back. The seat is not directly connected to the diaphragm, and is only affected by a downward movement of the aforesaid diaphragm.

In the line of welding accessories, 1929, saw improvements in welding gloves and in goggles, the particular ones described in the following both having been introduced by the Oxweld Acetylene Company.

Gauntlet gloves of a soft and pliable suede leather, specially treated to prevent heat from affecting it, are now available to replace the horsehide gloves formerly used. A new cap and skeleton-type helmet goggles were also placed on the market during the past year. The cap-type goggles consist essentially of a strong fibre cap, to which a pair of goggles is attached by means of fibre links. The goggles can be raised over the forehead or lowered over the eyes with one hand. The bridge is adjustable and is covered with rubber insulation. Replaceable lenses, in various sizes and colors, are available—the colored lenses being protected by cover lenses of clear glass. The skeleton-type goggles are the same as those just described, except that the goggles are attached to a lattice skeleton cap. Both styles are provided with leather straps at the rear for head-size adjustment.

## Two Pipe Lines Serving New Border Field

Great Falls, Mont.—A contest for the crude petroleum produced in the new border field, lying partly in Montana and partly in Alberta, has recently developed with the completion of two pipe lines, both on the Montana side, from the field to Sweetgrass and railhead. Maple Leaf Oil & Refining Company of Coutls, laid one line and the Illinois Pipe Line Company laid the other. Both are now completed and running about 500 barrels per day from the new field which has three wells completed and five drilling.

The last completion is Vanalta Oil Company's No. 2 which is believed to be good for about 70 barrels as it stands but which will doubtless be good for more production when, and if, deepened. It is a west offset to the company's discovery well, known as No. 1. Cosmos Petroleum Company is still delayed in the drilling-in of its well on the Thacker lease, it being still impossible to effect the necessary water shutoff. The well has a very good showing of oil and gas with some water. There is no question but that this will be one of the best, if not the best, well in the district, if the water can be shut off.

Many operators are waiting for the complettion of the Cosmos well before starting work on projected tests, but others are moving in and will be at work immediately.

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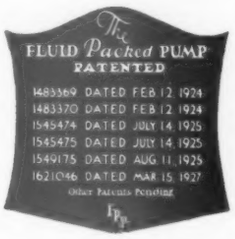


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# COMPLETIONS FOR PAST WEEK IN U.S. FIELDS

## SUMMARIZED REVIEW OF FIELD RESULTS

| State— | Completions This week | Completions Last week | Producers This week | Producers Last week | Gas Wells This week | Gas Wells Last week | Failures This week | Failures Last week | Initial Prod. This week | Initial Prod. Last week |
|---|---|---|---|---|---|---|---|---|---|---|
| Arkansas | 7 | 4 | 7 | 3 | .. | .. | .. | 1 | 141 | 77 |
| California | 18 | 22 | 16 | 21 | .. | .. | 2 | 1 | 5,650 | 10,800 |
| Illinois | 1 | 4 | .. | 2 | .. | .. | 1 | 2 | ... | 50 |
| Indiana | .. | 1 | .. | 1 | .. | .. | .. | .. | ... | 225 |
| Kansas | 15 | 18 | 6 | 4 | .. | 2 | 9 | 12 | 3,480 | 710 |
| Kentucky | 18 | 8 | 8 | 3 | .. | .. | 10 | 5 | 270 | 295 |
| Louisiana | 15 | 14 | 2 | 5 | 3 | 3 | 10 | 6 | 45 | 884 |
| Michigan | 7 | 5 | 5 | 4 | 1 | .. | 1 | 1 | 1,408 | 290 |
| New Mexico | .. | 4 | .. | 3 | .. | .. | .. | 1 | ... | 520 |
| Ohio | 31 | 28 | 9 | 12 | 10 | 8 | 12 | 8 | 132 | 1,102 |
| Oklahoma | 57 | 65 | 33 | 36 | 5 | 9 | 19 | 20 | 105,713 | 82,134 |
| Pennsylvania | 8 | 2 | 1 | .. | 6 | 1 | 1 | 1 | 2 | ... |
| Tennessee | .. | 1 | .. | .. | .. | .. | .. | 1 | ... | ... |
| Texas | 145 | 153 | 69 | 71 | 6 | 13 | 70 | 69 | 28,840 | 33,649 |
| West Virginia | 37 | 28 | 10 | 4 | 18 | 19 | 9 | 5 | 233 | 175 |
| Total | 359 | 357 | 166 | 169 | 49 | 55 | 144 | 133 | 145,914 | 130,911 |
| Increase this week | 2 | .. | .. | .. | .. | .. | 11 | .. | 15,003 | ... |
| Decrease this week | .. | .. | 3 | .. | 6 | .. | .. | .. | ... | ... |

## EASTERN STATES

### PENNSYLVANIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| GREENE COUNTY— | | |
| Equitable Gas Co Church 1 | ¶1 | .... |
| Smith 1 | ¶1½ | .... |
| Unknown parties, Johnson 1 | ¶¼ | .... |
| Fox & Foley, Phillips 5 | ¶¼ | .... |
| BEAVER COUNTY— | | |
| Leapold Rassomma, Guyoz-Rossomma 5 | 2 | .... |
| J. L. Abrams, Davidson 1 | * | .... |
| ALLEGHENY COUNTY— | | |
| McCurdy O&G Co., Stewart 1 | ¶1 | .... |
| T. W. Phillips G&O Co. Megi 1 | ¶1 | .... |

### WEST VIRGINIA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CALHOUN COUNTY— | | |
| Southern Gas Co., Linger 1 | ¶¼ | .... |
| Hope Const. & Ref. Co., Barr 3 | 5 | .... |
| Stump 1117 | 2 | .... |
| Southwestern Gas Co., Slider 1 | ¶¼ | .... |
| Smith & Bickel, Reynolds 1 | ¶½ | .... |
| GILMER COUNTY— | | |
| Trainer Oil & Gas Co., Snyder 1 | * | .... |
| Carnegie Nat. Gas Co., Young 1 | * | .... |
| Burton 3 | ¶1¼ | .... |
| Stout 2 | * | .... |
| KANAWHA COUNTY— | | |
| Pure Oil Co., Williams Coal 247 | 18 | .... |
| Williams Coal, 246 | 10 | .... |
| United Fuel Gas Co., Cabin Creek 4052 | ¶1 | .... |
| BOONE COUNTY— | | |
| Pure Oil Co., L. H. & P. tr., B-34 | ¶¼ | .... |
| L. H. & P. tr., A-38 | 10 | .... |
| Godfrey L. Cabot, Inc., Federal Coal, 35 | ¶¼ | .... |
| JACKSON COUNTY— | | |
| Capitol Oil Co., Gray 1 | 5 | .... |
| Field Gas Corp., Wade 1 | * | .... |
| South Penn Oil Co., McCarthy 4 | * | .... |
| LINCOLN COUNTY— | | |
| Allegheny Gas Co., Reynolds 1 | ¶¼ | .... |
| Guyan Oil Co., Mason 48 | ¶¼ | .... |
| United Fuel Gas Co., Jaynes 4011 | ¶¼ | .... |
| RITCHIE COUNTY— | | |
| Devol & Devitt, Cunningham 1 | * | .... |
| Fox Farm O&G Co., Darnell 1 | * | .... |
| Weirick & Snyder, Weirick 1 | ¶1 | .... |
| ROANE COUNTY— | | |
| Heck Oil Co., Enoch 6 | 175 | .... |
| Richard Elkins & Co., Cottrell 1 | ¶1¼ | .... |
| DODDRIDGE COUNTY— | | |
| Hope Construction & Ref. Co., Pigott 4 | 10 | .... |
| Gribel 3 | 3 | .... |
| MINGO COUNTY— | | |
| E. J. Evans, Ferrell 11 | ¶½ | .... |
| Red Jacket O&G Co., Red Jacket Coal 12 | ¶½ | .... |
| CLAY COUNTY— | | |
| Virginian Gasoline & Oil Co., Summers 8 | 5 | .... |
| WETZEL COUNTY— | | |
| Stewart O&G Co., Stewart 1 | ¶1½ | .... |

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| MARSHALL COUNTY— | | |
| Manufacturers Light & Heat Co., Chambers 3 | ¶1½ | .... |
| CABELL COUNTY— | | |
| J. V. Reisman, Grass 2 | ¶1 | .... |
| Penn Nat. Gas Co., Freeman 1 | ¶½ | .... |
| WOOD COUNTY— | | |
| Henderson Oil Co., Henderson 4 | * | .... |
| TYLER COUNTY— | | |
| J. W. Pentz & Co., Smith 3 | * | .... |

### KENTUCKY

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| DAVIESS COUNTY— | | |
| Eastern Gulf Oil Co., Chapman 4 | 25 | .... |
| Evans & Garrison, Clark 1 | * | 1780 |
| Cumberland Petroleum Co., McCormick 1 | * | 1288 |
| OHIO COUNTY— | | |
| C. M. Root & Co., Wigginton 6 | 150 | 550 |
| Ohio Oil Co., Whittaker Hrs. 6 | 35 | .... |
| L. C. Young & Co., Morton 1 | * | .... |
| J. M. Meredith & Co., Carter 1 | * | .... |
| Boop & McDonough, Newton 1 | * | .... |
| WARREN COUNTY— | | |
| O. C. Wood, Adams 4 | 2 | 1068 |
| MAGOFFIN COUNTY— | | |
| Peoples Pittsburg Trust Co., Wheeler 2 | 3 | .... |
| Mosbald Dev. Co., Dowery 1 | 8 | .... |
| McCREARY COUNTY— | | |
| Smith-Cameron Co., Bell 3 | * | .... |
| WAYNE COUNTY— | | |
| M. D. Shearer & Co., Upchurch 1 | * | .... |
| Johnson & Co., Sheffield 1 | * | .... |
| Vulcan Oil Co., State Nat. Bank land 25 | * | .... |
| MORGAN COUNTY— | | |
| W. H. Cillier, Upper Haney 3 | 2 | .... |
| MUHLENBERG COUNTY— | | |
| Unknown parties, Drake 1 | 45 | 1218 |
| Missouri-Kansas Pipe Line Co., Robertson 1 | * | .... |

### SOUTHEASTERN OHIO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| WASHINGTON COUNTY— | | |
| Levi Hall, Hall-Dixon 19 | 2 | 1226 |
| C. S. Hixon & Co., Ellis 8 | 2 | .... |
| Joseph Hall, Fee 1 | 2 | .... |
| Robt. W Turney & Co., Leasure 8 | 2 | .... |
| MORGAN COUNTY— | | |
| C. E. Bode & Co., Allen 1 | 2 | .... |
| The Kemrow Co., Allen 4 | ¶½ | 1523 |
| MONROE COUNTY— | | |
| Henry Oil Co., Friday 2 | * | .... |
| NOBLE COUNTY— | | |
| Thos. Bryan & Co., Bryan 8 | * | 1138 |

### CENTRAL OHIO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| ATHENS COUNTY— | | |
| Ohio Fuel Gas Co., Hoover 2 | * | 1590 |
| Caldwell 2 | ¶¼ | 941 |
| Henry 1 | ¶½ | 1584 |
| Fairfield Gas Co., Jeffers 1 | * | 663 |
| Gross & Freebault, Van Vorhes 1 | * | 1125 |
| MUSKINGUM COUNTY— | | |
| Craig, Adair & Co., Tewksbury 2 | 30 | 3525 |
| Ohio Fuel Gas Co., Swigert 1 | * | 3677 |

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| WAYNE COUNTY— | | |
| Barnhatr & Co., White 3 | ¶¼ | 2958 |
| Harmon & George, Buckholtz 3 | ¶¼ | 673 |
| GUERNSEY COUNTY— | | |
| George McLaughlin, Tompkins 2 | ¶¼ | 1083 |
| Kemrow Co., Lubonseick 1 | * | 1716 |
| KNOX COUNTY— | | |
| Ohio Fuel Gas Co., Workman 3 | ¶6½ | .... |
| Upham Gas Co., Bross 1 | ¶6½ | 2806 |
| ASHLAND COUNTY— | | |
| Ohio Fuel Gas Co., Darrow 1 | * | .... |
| Jones & Co., Winbigler 7 | * | 630 |
| PERRY COUNTY— | | |
| McClay & Whitmer, Melick 1 | 55 | 3487 |
| HARRISON COUNTY— | | |
| George A. Hillegas, Hillegas 1 | 2 | .... |
| COSHOCTON COUNTY— | | |
| Ohio Oil Co., Aiken 2 | * | .... |
| BELMONT COUNTY— | | |
| J. E. Groimes & Co., Groimes 3 | ¶¼ | 1390 |
| LORAIN COUNTY— | | |
| Ohio Fuel Gas Co., Koliah 1 | * | .... |

### NORTHWESTERN OHIO

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| HANCOCK COUNTY— | | |
| R. T. Rittenhouse, Freed 8 | 35 | .... |
| SENECA COUNTY— | | |
| Hulse & Kundtz, Abbott 1 | * | .... |
| A. B. Strouse & Co., Stahl 1 | ¶¼ | 550 |

### ILLINOIS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CRAWFORD COUNTY— | | |
| Arkansas Fuel Oil Co., & Co., Ikemire 2 | * | .... |

### MICHIGAN

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| MIDLAND COUNTY— | | |
| Pure Oil Co., Ward 2 | 500 | 3550 |
| Vinton 1 | 308 | 3550 |
| Coats 1 | 200 | 3554 |
| State-Midland A-2 | 200 | .... |
| State-Midland B-2 | 200 | .... |
| MUSKEGON COUNTY— | | |
| Wego Oil Co., Nichols 2 | ¶1 | 2060 |
| INGHAM COUNTY— | | |
| Hillmur Oil Co., Potter 1 | * | .... |

## CALIFORNIA

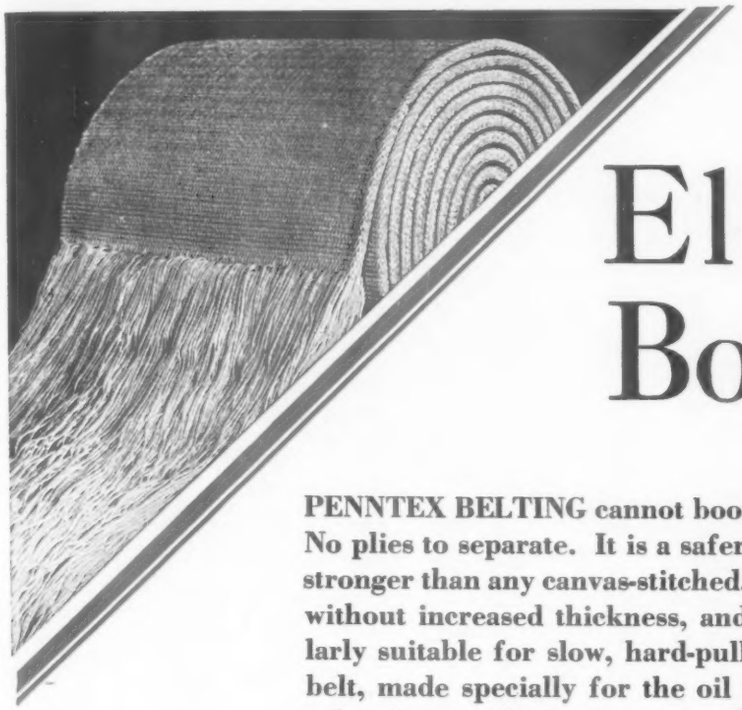
| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| LONG BEACH— | | |
| Shell Oil Co., Alamitos 32 | 100 | 6445 |
| Hancock Oil Co., Signal 22 | 200 | 7130 |
| Higgins Bros., No. 1 | 700 | 7020 |
| A. T. Jergins Trust, Syndicate-Municipal 27 | 50 | 8308 |
| ROUND MOUNTAIN— | | |
| Shell Oil Co., Jewett 2-9 | 150 | 1690 |
| SANTA FE SPRINGS— | | |
| Bandini Pet. Corp., Off 15 | 1300 | 8015 |
| Shell Oil Co., G. H. N. 24 | 700 | 7900 |
| Standard Oil Co., Walker 22 | 150 | 7810 |
| The Texas Co., Mutual 2 | 200 | 7970 |
| Universal Oil Co., O'Connell 6 | 300 | 7960 |
| General Pet. Corp., No. 137-E | 450 | 6900 |
| George F. Getty, No. 22 | 600 | 8025 |
| No. 43 | 300 | 7950 |
| St. Helens Pet. Co., Hill 1 | 100 | 6800 |
| The Texas Co,. Weaver 8 | 250 | 7930 |
| Batson 3 | 100 | 5180 |

## NORTH LOUISIANA

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| CADDO PARISH— | | |
| Thomason & Fitzsimmons, Howell 1, 13-22-16 | * | 2950 |
| LA SALLE PARISH— | | |
| S. D. Ray, Urania 1, 19-10-2e | 35 | 1568 |
| RICHLAND PARISH— | | |
| Franklin O&G Co., F. Smith 1, 24-16-6e | ¶52 | 2454 |
| M. L. Meredith, Holdiness 1, 15-16-6e | ¶41 | 2446 |

## ARKANSAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| OUACHITA COUNTY (Smackover)— | | |
| L. K. Hamilton, Arnold & Doyle 1, 23-15-16 | 37 | 2039 |
| Houston Oil Co. of Texas, J. D. Reynolds 4, 27-15-15 | 35 | 2026 |
| UNION COUNTY (Smackover)— | | |
| Lion O. R. Co., James 1, 6-16-15 | * | 2018 |
| Pure Oil Co., Merriweather 1, 6-16-15 | 11 | 1966 |
| Root Ref. Co., Bradford 1, 7-16-15 | 5 | 2190 |
| Skelly Oil Co., Bilyew B-4, 8-16-15 | 35 | 2689 |



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## TEXAS PANHANDLE

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| **CARSON COUNTY—** | | |
| Denson et al, W. E. Cobb 1 | * | 2200 |
| Reiger et al, J. B. Hodges 1 | ¶5 | 3735 |
| **GRAY COUNTY—** | | |
| McMan O&G Co., Palmer 7 | 950 | 2935 |
| Operators Oil Co., Cook-Faulkner 5 | 100 | 2970 |
| Smith & McDaniels, T. B. Noble 1 | 50 | 2828 |

## NORTH TEXAS

| | | |
|---|---|---|
| **ARCHER COUNTY—** | | |
| Barnsdall Oil Co., Wilson 10-A | 35 | 1711 |
| Wilson 19-B | 40 | 1708 |
| Bateman & Dingee, Ferguson 1 | * | 1848 |
| Butler & Wise, Kunkel 1 | * | 1204 |
| Roy I. Carter et al, Young 1 | * | 1430 |
| Consolidated Oil Co., K. & K. 1 | * | 1852 |
| F. P. Cullum et al, Falls County 5 | 35 | 1136 |
| T. F. Hunter et al, Kunkel 2-A | 150 | 1164 |
| E. B. Lawson-Duke et al, Richardson 6 | 60 | 1411 |
| M. & V. Oil Co., Kunkel 3 | 65 | 1155 |
| Pandem Oil Corp., Young 4-D | 10 | 1444 |
| Young 5-D | 125 | 1414 |
| Prairie O&G Co., Richardson-Clark 8 | * | 1422 |
| J. P. Rayzor et al, Turbeville 2-B | * | 1525 |
| **BAYLOR COUNTY—** | | |
| Consolidated Oil Co. et al, Portwood 11 | 75 | 1425 |
| Portwood 12 | 450 | 1402 |
| Portwood 1-F | * | 1452 |
| **CLAY COUNTY—** | | |
| Bi-State O&G Co., American Ref. Fee 1 | * | 2302 |
| Reno Oil Co., Nutter 1 | * | 802 |
| **COOKE COUNTY—** | | |
| American Refining Properties, Fields 1 | * | 1526 |
| R. F. Smith et al, Dickerson 1 | * | 2013 |
| **JACK COUNTY—** | | |
| Panhandle Ref. Co., Box 3 | 250 | 3107 |
| Leffel-Morrissey 2-A | 65 | 3156 |
| **MONTAGUE COUNTY—** | | |
| Continental Oil Co. & Bridwell Oil Co., Cunningham 4-C | 40 | 1271 |
| **THROCKMORTON COUNTY—** | | |
| Donnelly et al, Reynolds 1 | * | 828 |
| **WICHITA COUNTY—** | | |
| Arkansas Fuel Oil Co., K. & K. 26-A | 55 | 1761 |
| T. F. Hunter et al, Waggoner Bros. 11-C | 45 | 1295 |
| Humble O&R Co., Taylor 21 | 170 | 1769 |
| Magnolia Pet. Co., Kemp & Blair 3 | 15 | 1234 |
| **YOUNG COUNTY—** | | |
| Bridwell Oil Co., Leberman 1 | * | 970 |
| F. E. Butler et al, Andrews 1 | * | 895 |
| Britt Cranfill & Texas Co., Gass 1 | * | 1303 |
| Junker & Perkins, Hausler 1 | * | 925 |
| C. B. Long et al, Hausler 2 | * | 1215 |
| Madden & Petroleum Producers Co., Deitrich 4 | 160 | 1130 |
| Martin & Cochran, Slater 1 | * | 802 |
| Mitchell & Cooper, Wilson 1 | * | 1010 |
| Mitchell & Palmer, West 1 | * | 1155 |
| W. R. Stafford et al, Brooks 1 | * | 509 |
| E. J. Stump & Heydrick, Daniels 4 | 75 | 890 |
| Ven-Mex Oil Co., Jones 1 | * | 943 |
| Wise & Porterfield, Cullers 4 | * | 682 |
| D. L. Wolf et al, Hill 4 | 50 | 1030 |
| Womac Oil Co., Roach 3 | 15 | 746 |

## EAST TEXAS

| | | |
|---|---|---|
| **PANOLA COUNTY—** | | |
| Texas Co., H. L. Brumble 4, E. F. Mitcheson sur | ¶1 | 2350 |

## CENTRAL WEST TEXAS

| | | |
|---|---|---|
| **BROWN COUNTY—** | | |
| Arcadia Ref. Co., Andrews 1 | * | 1408 |
| Bush & Roberts, Richardson 1 | * | 1440 |
| Roberts et al, Whitehead 1 | * | 1587 |
| The Texas Co., Johnson 7 | 95 | 1314 |
| **CALLAHAN COUNTY—** | | |
| Bradstreet & Holden, Miller 15 | 60 | 1630 |
| Gibson & Johnson, Jackson 2 | ¶2 | 951 |
| Humble O. & R. Co., Jackson 1-E | * | 1200 |
| Prairie O. & G. Co., Seale 1 | * | 1502 |
| Young Bros. and Alexander, Hickman 1 | * | 755 |
| **COLEMAN COUNTY—** | | |
| Continental Oil Co. and M. G. Cheney, Gardner 2 | * | 2775 |
| Howard Samuels et al, Robertson 3 | 15 | 1070 |
| **EASTLAND COUNTY—** | | |
| Ed. Larson et al, Ramsower 1 | * | 4468 |
| **ERATH COUNTY—** | | |
| Associated Oil Co., Moring 2 | ¶6½ | 3319 |
| Brown Drlg. Co., Davis 1 | * | 3470 |
| Culberson Bros. Co., Wyatt 1 | * | 3709 |
| **KIMBLE COUNTY—** | | |
| Bryant et al, Lambert 1 | * | 775 |
| **PALO PINTO COUNTY—** | | |
| Brazos River O. & G. Co., Wharton 1 | ¶½ | 4275 |
| Wickens et al, Ames 1 | ¶1¼ | 2990 |
| **SHACKLEFORD COUNTY—** | | |
| Cranfill-Reynolds Co., Mathews 3 | 10 | 1158 |
| Holden & Buddrus, Compton 1 | * | 350 |
| **STEPHENS COUNTY—** | | |
| Hickock Prod. & Dev. Co., Walker 5 | * | 3050 |

## WEST TEXAS

| | | |
|---|---|---|
| **HOWARD COUNTY—** | | |
| Continental Oil Co., Chalk 7-C | 60 | 1843 |
| Empire Gas & Fuel Co., Clay 4 | 90 | 2105 |
| Humble O. & R. Co., Clay 10 | 500 | 2920 |
| Merrick & Bristow, Roberts 11 | 345 | 3005 |
| Moody Corp., Roberts 20-E | 75 | 2691 |
| The California Co., Roberts 5, Lse 1 | 15 | 3250 |
| **MITCHELL COUNTY—** | | |
| Magnolia Pet. Co., Snyder 1 | * | 3270 |
| **PECOS COUNTY—** | | |
| Dixie Oil Co., Toborg 2 | 250 | 428 |
| McMan O. & G. Co., Smith 11-C | 70 | 1730 |
| Mid-Kansas-Transcontinental, Smith 8 | 4200 | 1720 |
| World Oil Co., University 2-A | * | 1659 |
| **REAGAN COUNTY—** | | |
| Big Lake Oil Co., University 175 | 50 | 3074 |
| University 178 | 50 | 2940 |

## NEW MEXICO

| | | |
|---|---|---|
| **LEA COUNTY—** | | |
| Texas Pacific Coal & Oil Co., State 3-A | 1700 | 3708 |

## TEXAS GULF COAST

| | | |
|---|---|---|
| **BARBERS HILL—** | | |
| Unice Oil Co., Feldman 2 | 250 | 5162 |
| **BLUE RIDGE—** | | |
| Sheffield, Telshaw & Cady, Blakeley 2 | 60 | 2800 |
| **BOLING—** | | |
| Houston Gulf Gas Co., Fields 1 | * | 4305 |
| **ESPERSON DOME—** | | |
| Cranfill-Reynolds Co., Davis 2 | 350 | 2320 |
| Esperson 7-A | 700 | 2296 |
| **EUREKA—** | | |
| Buffalo Oil Co., Beall 1, 2 mi nw Eureka, Harris County | * | 4662 |
| **GENOA—** | | |
| Humble, Woodburn 2, 2 mi s Genoa | * | 5241 |
| **HULL—** | | |
| Republic Prod. Co., Dolbear 57, dd | 40 | 2980 |
| **HUMBLE—** | | |
| Sun Oil Co., Chambers Co. Agr. Ass'n. 4 | 340 | 5375 |
| South Texas Pet. Co., Lee 3 | 350 | 5133 |
| **MOORES FIELD—** | | |
| Gulf, Moore 20 | 2200 | 3980 |
| **GOOSE CREEK—** | | |
| Gulf, State Land Oil Co. 25, wo | 120 | 3290 |
| **PETTUS—** | | |
| Union Producing Co., Ray 5 | 1900 | 3957 |
| Ray 6 | * | 5082 |
| **PIERCE JUNCTION—** | | |
| Pure Oil Co., Herman 1 | * | 4970 |
| Anderson & Plummer, Whitehead 6, dd | * | 6590 |
| **RACCOON BEND—** | | |
| Humble-Valley, Deutrich B-8 | 75 | 3256 |
| Duncan State Land 1 | 270 | 3291 |
| **REFUGIO—** | | |
| Houston Oil Co., Rooke Hotel 1 | 500 | 3691 |
| Carlysle 1 | 700 | 3717 |
| Union Producing Co., O'Brien 2 | * | 5558 |
| J. F. B. Heard 2 | 500 | 3668 |
| **SARATOGA—** | | |
| Rio Bravo Oil Co., Cotton 81 | * | 600 |
| **SAN FELIPE—** | | |
| Kirby Petroleum Co., Jim Davis 1 | * | 2941 |
| **SOUTH LIBERTY—** | | |
| Sun Oil Co., Mitchell 54 | 15 | 3560 |
| **SPINDLE TOP—** | | |
| Yount-Lee Oil Co., McFadden 118, dd | * | 4200 |
| McFadden 125 | 900 | 2820 |
| **WEST COLUMBIA—** | | |
| The Texas Co., Arnold 26 | 220 | 2694 |

## SOUTH LOUISIANA

| | | |
|---|---|---|
| **DOG LAKE BAYOU—** | | |
| The Texas Co., Dog Lake Bayou B-2 | * | 6347 |
| **PINE PRAIRIE—** | | |
| Evangeline Oil Co., Guillery 1 | * | 2973 |
| **STARKS DOME—** | | |
| Texas Gulf Sulphur Co., Lutcher-Moore 11 | * | 1700 |
| Lutcher-Moore 12 | * | 1750 |
| **VERMILION BAY—** | | |
| The Texas Co., Vermilion Bay A-4 | * | 6125 |

## SOUTH WEST TEXAS

| | | |
|---|---|---|
| **CALDWELL COUNTY—** | | |
| Buchanan et al, Cude 1 | 260 | 2185 |
| Sun Oil Co., Cude 1 | 60 | 2105 |
| **DUVAL COUNTY—** | | |
| Magnolia, Benavides 6 | 60 | 2820 |
| **GONZALES COUNTY—** | | |
| Adams & Lyle, Reid 1 | * | 1971 |
| Madron Oil Co., Robinson 1 | * | 1544 |
| **DARST CREEK—** | | |
| Jarmon et al, Guadalupe County 1 | 900 | 2602 |
| Gulf, McKean Dix 5 | 1100 | 2618 |
| Sun Oil Co., Knoblock 4 | 4400 | 2548 |
| The Texas Co., Posey 2 | 1000 | 2606 |
| **JIM HOGG COUNTY—** | | |
| Magnolia, Weil 1, Sec. 85 | * | 3530 |
| **WEBB COUNTY—** | | |
| Magnolia, Brennan Benavides 4 | * | 3510 |
| **ZAPATA COUNTY—** | | |
| O. W. Killam, Cuellar 12 | 600 | 1542 |
| **SALT FLAT—** | | |
| Humble, Briscoe 4 | 125 | 2759 |
| **LIVE OAK COUNTY—** | | |
| Houston Oil Co., J. B. Dunning 1 | * | 5135 |
| **MEDINA COUNTY—** | | |
| Mid-Kansas O. & G. Co., J. Newton 1 | * | 1990 |
| **TRAVIS COUNTY—** | | |
| Lightfoot et al, Fleischer 1 | * | 600 |
| **ZAVALLA COUNTY—** | | |
| Anglin et al, Pryor 1 | * | 1326 |
| **GUADALUPE COUNTY—** | | |
| Adams & Lysle, Hoffman 1 | * | 2670 |
| **HAYS COUNTY—** | | |
| E. A. Buckland, Elsner 1 | * | 2475 |

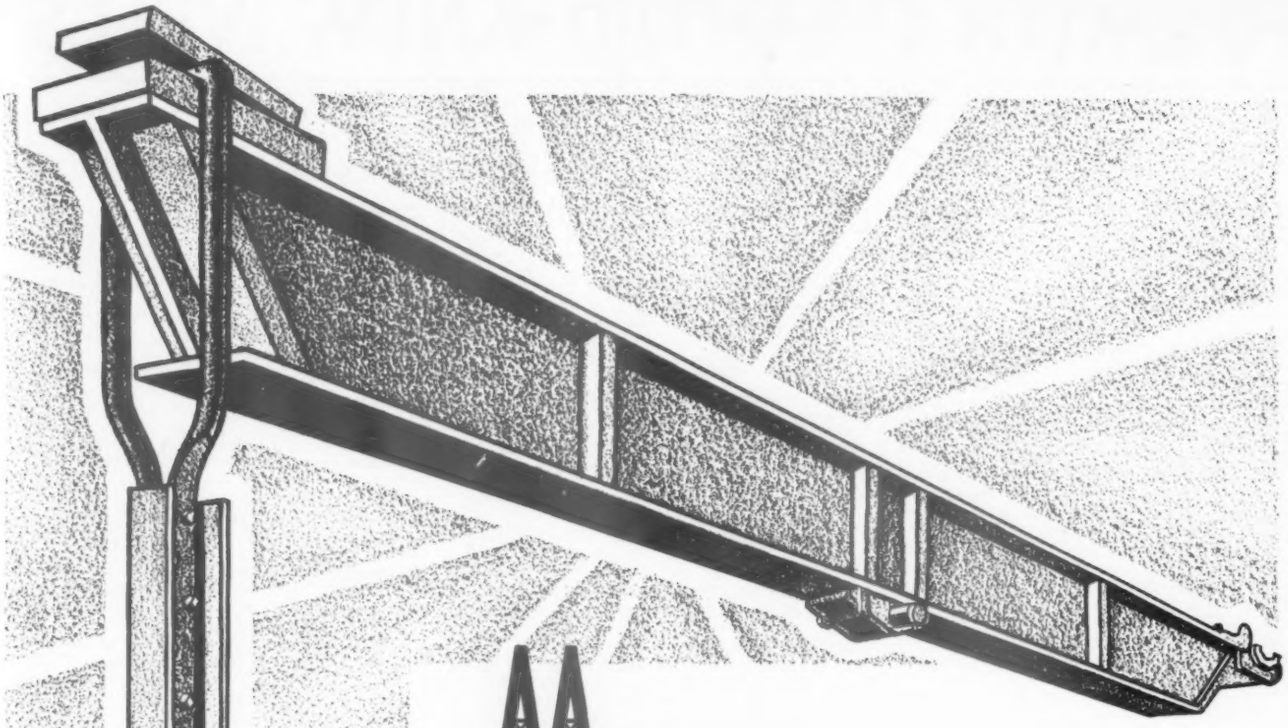
## KANSAS

| | | |
|---|---|---|
| **BUTLER COUNTY—** | | |
| Jones et al, Black 1, ne nw ne 31-23-6e | * | 2666 |
| **COFFEY COUNTY—** | | |
| Roth and Faurot, Holt 1, sw ne sw, 12-32-4e | 115 | 2593 |
| **ELLIS COUNTY—** | | |
| Mid-West Exploration Co., Austin 24, ne se ne, 36-12-16w | 215 | 3069 |
| **GREENWOOD COUNTY—** | | |
| Dixie Oil Co. et al, Ellis 5, ne sw nw, 27-23-11e | 50 | 1928 |
| Derby Oil Co., Biggs 1, ne ne sw, 36-24-10e | * | 1950 |
| **McPHERSON COUNTY—** | | |
| Texas Company, Stuckey 1, nw sw sw, 10-21-3w | 1330 | 3401 |
| Derby Oil Co., Stuckey 2, nw ne se, 9-21-3w | 1470 | 3328 |
| **OSBORNE COUNTY—** | | |
| Phillips Pet. Co., Grieve 1, nw se ne, 6-7-12w | * | 4389 |
| **RUSSELL COUNTY—** | | |
| Jamot Brown et al, Baumrucker 1, ne c 18-14-15w | * | 3439 |
| Gilbreath et al, Mansfield 1, se c sw, 16-12-13w | * | 3470 |
| **SEDGWICK COUNTY—** | | |
| Shell Pet. Corp., Southwestern College 1, sw se sw, 2-27-1w | 300 | 3394 |
| Dixie and Amerada, Foulston 1, sw c nw, 11-26-2e | * | 3336 |
| **SMITH COUNTY—** | | |
| Philips Pet. Co., Clydesdale 1, se c nw, 23-5-14w | * | 4184 |
| **SUMNER COUNTY—** | | |
| Kingwood Oil Co., Stayton 1, c ne, 18-31-2w | * | 4361 |
| **TREGO COUNTY—** | | |
| Phillips Pet. Co., Spitz 1, se c 24-12-25w | * | 4670 |

## OKLAHOMA

| | | |
|---|---|---|
| **CARTER COUNTY—** | | |
| Magnolia Pet. Corp., Gill 5, ne se ne, 23-1s-3w | 25 | 2563 |
| Magnolia Pet. Corp., Anderson 5, nw c, 23-1s-3w | 25 | 2688 |
| **CREEK COUNTY—** | | |
| Shaffer Oil & Refg. et al, Lewis 1, se sw sw, 10-15-8e | 235 | 3841 |
| Pure Oil Co., Berryhill 27, cwl, ne ne 18-17-12e | ¶3/10 | 1672 |
| Curtis Oil Co., et al, Little Head 1, sw nw nw 20-17-10e | 10 | 2654 |

(Continued on Page 262)



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## TEXAS

Lease or Owner, Acreage, Well, Survey, Distance to lease lines or well.

ARCHER COUNTY — Flowers & Barclay, Wichita Falls, M. E. Rogers, 146, 1, 1596 TE&L sur, 1803 ft from n and 1470 ft from w li sec.

ANDERSON COUNTY—Humble, Houston, A. E. Todd, 59, A4, D. Clark sur, 150 ft from s and w lines.

BROWN COUNTY—Paramount Oil Royalties, Inc., Brownwood, L. A. McDonald, 75, 1, BBB&C sur, 600 ft from n and 550 ft from e line.

BROOKS COUNTY—A. W. Dinn, Hebronville, J. G. Ramos, 5, Blk 1, La Mestena sur, 750 ft from e and 1250 ft from s line.

BAYLOR COUNTY—A. B. Smith, Archer City, A. J. Kulhanek, 120, 1, 2430 TE&L sur, 150 ft from s and 1125 ft from w line. Consolidated Oil Co. & Petroleum Prod. Co., W. H. Portwood, 80, 12, 1281 TE&L sur, 300 ft n of No. 6 in sw¼; 13, 300 ft n of No. 10; 14, 300 ft n of No. 12. Wayne King, Archer City W. B. Mills, 10, 1, 2414 TE&L sur, 150 ft from w and 1161 ft from s line.

BEE COUNTY—Texas Co., Houston, J. W. Suffell, 279, 1, J. M. Uranga sur, 1090 ft from se and 150 ft from sw line.

BEXAR COUNTY—Texas Pet. Co., San Antonio, H. C. Gayle, 140, 3, B 39, C. A. Yoakum sur, 700 ft s of No. 2.

BRAZORIA COUNTY—Texas Co., Houston, O. F. Ewing, 105, 1, H. N. Little sur, 150 ft from n and w lines of lot 29.

CALLAHAN COUNTY—States Oil Corp., Eastland, H. W. Ross, 1, S 98, BBB&C sur, 660 ft from n and e lines of sec. W. A. & V. W. Hart, Eastland, W. M. Kurklin, 57, 1, M. Cherry sur, 350 ft from n and e lines. Culbertson Bros., Fort Worth, M. Alexander, 60, 1, S 11, E. T. Ry. sur, 150 ft from s and 425 ft from e line sec. Mortimer Oil Co., & Bateman, Abilene, B. Miller, 80, 1, S 527, H. L. Hunter sur, 660 ft from n and e lines of sec. Humble, Cisco, I. N. Jackson, 320, G1, S 5, T&NO sur, 4646 ft from n and 200 ft from e line. Sun Oil Co., Dallas, Snyder, 40, 26, S 4, Blk. C, T&NO sur, 150 ft from n and w li ne¼ of sw¼. H. H. Adams, Fort Worth, H. Wagley, 80, 18, S 2, D&D Asy sur, 150 ft from n and 500 ft from e line. Mook-Texas Co., Fort Worth, F. Johnson, 89, 4, B 83, CCSL sur No. 181, 580 ft from n and 380 ft from w li sec.

COLEMAN COUNTY — Permian Oil Co., Eastland, P. J. Reeves, 162, 2, No. 245 J. C. Goodrich sur, 300 ft w of No. 1. Taylor-Link Oil Co., San Angelo, S. C. Stewardson, 65, 2, S 96, E. T. Ry. sur, 150 ft from n and w lines. McMan O&G Co., Tulsa, Okla., S. C. Stewardson, 120, 1, Truner & Wilson sur, 150 ft from n and w lines.

CHAMBERS COUNTY—Yount-Lee Oil Co., Beaumont, Woodward, 6, Wm. Hodges sur, 1536 ft from n and 1725 ft from w li sur; Phillips, 3, Wm. Hodge sur, 930 ft from n and 2220 ft from w li sur. Mills Bennett Prod. Co., Houston, P. Higgins, 14, 1, Wm. Hodge sur, 150 ft from s and 50 ft from w line; G. W. Collier, 11, 3, Wm. Hodge sur, 900 ft from w and 50 ft from n line. Sun Oil Co., Beaumont, McKinney, 7, 4, Wm. Hodge sur, 50 ft from n and 100 ft from w line.

CLAY COUNTY—R. M. Johnson, Ardmore, Okla., H. Sanzenbacher, 1, L. B. Sparks sur, 300 ft from w and 2500 ft from s line. Ray Dawson, Oklahoma City, S. Roberts, 49, 1, B 74, PCSL sur, 200 ft from s and e lines. G. E. Hurt, Dallas, Byers, 160, 1, B 8, PCSL sur, 1000 ft from w and 400 ft from s line.

COOKE COUNTY—W. F. Russell, Box 502, Gainesville, C. Jacobs, 138, 1, Wm. Caldwell sur, No. 208, 150 ft from e and 740 ft from s line. Faith Oil Corp., Wichita Falls, J. F. Bugg, 150, 1, H. Nail sur, 150 ft from n and w lines. Fain-McGaha Oil Corp., Wichita Falls, S. Goff, 40, 1, S. P. Ry. sur, 150 ft from n and e lines. A. C. Hill, Wichita Falls, Gibson, 60, 1, J. F. Johnson sur, 150 ft from n and e lines; W. R. Cannon, 40, 1, T. Hutchinson sur, 150 ft from n and e lines.

CRANE COUNTY—Cranfill Bros. Oil Co., Dallas, J. B. Tubb, 1920, 1, S 8, B B27, School sur, 330 ft from s and e lines of ne¼.

CALDWELL COUNTY—Humble, Houston, T. Briscoe, 56, 4, J. Hinds sur, 150 ft from n and 1350 ft from w line.

CARSON COUNTY—Skelly Oil Co., Tulsa, Okla., H. Schafer, 480, 21, S 68, B4 I&GN sur, 660 ft s of No. 18.

CROCKETT COUNTY — Trans-Texas Oil Co., Midland, J. M. Shannon, 40, 2, S 42, B BB2.

DUVAL COUNTY—Humble, Houston, Kohler, 43, No. 169 J. Poitevent sur, 825 ft from n and 165 ft from w line. Trapshooter Reilly Oil & Royalty Co., San Antonio, C. W. Hahl, 40, 5, S 250, Lot 27, 850 ft from n and 420 ft from w li lot 27.

EASTLAND COUNTY—Lone Star Gas Co., Dallas, M. B. Lloyd, 366, 1, J. Rubarth sur, 1715 ft from w and 2322 ft from s line.

ECTOR COUNTY—Humble, Wichita Falls, A. Kloh, D, 640, 6, S 7, B 44, T&P sur, 660 ft n of No. 5; 5, 644 ft n of No. 2. T. P. Coal & Oil Co., Thurber, B. W. McKenzie, 160, 1, S 28, B B45, T&P sur, 1650 ft from s and 330 ft from e li sec.

FREESTONE COUNTY—Haley & Young, Teague, D. M. Worthy, 127, 1, J. L. Chavert sur, 1500 ft from e and 450 ft from s line.

FORT BEND COUNTY—Humble, Houston, Bankers Mtge., 34, 3, Wm. Little sur, 469 ft from w and 60 ft from n line.

GUADALUPE COUNTY—Texas Co., Houston, Knobloch, B, 75, 6, J. R. Robinson sur, 300 ft ne of No. 5; 4, 150 ft from nw and 455 ft from sw line. S. B. Owens, Inc., Brownwood, W. Harborth, 52, 1, R. Hall sur, 150 ft from s and e lines. Trinity Drillers, Inc., San Antonio, R. Miller, D, 14, 1, J. B. Alexander sur, 150 ft from n and w lines. Empire, Bartlesville, Okla., H. Willie, 40, 1, J. Darst sur, 150 ft from n and w lines; C. Knobloch, 40, 1, J. R. Robinson sur, 150 ft from s and e lines. Texas Co., Houston, Knobloch, A, 74, 2, J. R. Robinson sur, 450 ft from sw and 150 ft from se line; 3, 626 ft ne of No. 2; 4, 300 ft ne of No. 3; Knobloch, B, 75, 5, J. R. Robinson sur, 626 ft ne of No. 4B. Gulf Prod. Co., Houston, C. Anderson, 50, 2, J. C. Darst sur, 700 ft from e and 450 ft from n line.

GOLIAD COUNTY — Humble, Houston, Lackey, 1, J. Gomez sur, 2000 ft from se and sw lines.

GRAY COUNTY—Gulf Prod. Co., Wichita Falls, J. M. Sanders, 130, 4, S 40, B 3, I&GN sur, 330 ft from n and 990 ft from e li sw¼. Phillips Pet. Corp., Bartlesville, Okla., J. E. Wood, 80, 1, S 13, B 3, I&GN sur, 991 ft from w and 330 ft from s line n½ sw¼. Champlin Ref. Co., Enid, Okla., Cook, 120, 6, S 30, B B2, H&GN sur, 3592 ft from w and 330 ft from n line sec. Texas Co., Wichita Falls, J. E. Wright, 160, 2, S 13, B 3, I&GN sur, 330 ft from s and 3476 ft from w line sec. Shamrock O&G Co., Amarillo, Clayton, C, 60, 4, S 50, B 25, H&GN sur, 730 ft from n and 718 ft from e line.

GRAYSON COUNTY—F. H. E. Oil Co., & Kimbell, Sherman, A. J. Henderson, 80, 1, B. Holder sur, 1228 ft from n and 972 ft from e line.

GLASSCOCK COUNTY—Schermerhorn Oil Co. & Winton Co., Tulsa, Okla., Kloh, 240, 3, S 13, B 32, T&P sur, 990 ft from w and 330 ft from s line.

HARRIS COUNTY — Rolyat Prod. Co., Humble, Texas Co., 1½, 7, Jas. Strange sur, center of blk. 8. G. H. Hermann, 20, 4, blk 9, R. Dunman sur, 400 ft from n and 350 ft from w line. Conway, 14, 6 ,B 14, Jas. Strange sur, 505 ft from s and 25 ft from e line. D. B. Cherry, 6, 2, B 1, Jas. Strange sur, center of lot 6. Woods & Bennett, Humble, Malevinsky, 1, Jas. Strange sur, 12 ft from s and w lines of lot. Cezeaux & Martin, Humble, W. Pickens, 2, 2, B 10, J. B. Stevenson sur, 50 ft from n and e lines. Southern Drilling & Prod. Co., Houston, Josephine, ½, 1, B 3, Lot 21, Riverbed sur, 22 ft from w and 106 ft from s line. M. Lerew, Houston, J. B. Cicero, 10, 1, E. Ruhl sur, 150 ft from e and 100 ft from s line. Rio Bravo Oil Co., Houston, J. J. Settegast, 102, A19, J. Kopman sur, 300 ft se of No. 7.

HARRISON COUNTY — Shell Rock Dev. Co., Marshall, W. O. Daugherty, 105, 1, W. B. Burress sur, 1611 ft from n and 620 ft from e line.

HARDIN COUNTY — Rio Bravo Oil Co., Houston, Fee, 158, C81B, J. F. Cotton sur, 4 ft s of No. C81A.

HILL COUNTY—Mahon et al, Mt. Calm, M. K. Barrett, 515, 1, M. H. Shadburn sur, 150 ft w of center of e line.

HUTCHINSON COUNTY—Smith, McDonald & McMillan, Electra, H. C. Pitcher, 80, 1, S 19, B M21, T. C. Ry. sur, 330 ft from s and e line e¼ sw¼.

IRION COUNTY—P. I. Fox, Ranger, F. Tankersley, 40, 2, Sec. 712 sur, 300 ft w of No. 1, ne¼ of se¼. C. H. Cromwell, San Angelo, J. M. Nutt, 100, 2, S 6, GCSL sur, 1162 ft from w and 504 ft from n li sec. Texannati Oil Co., San Angelo, J. M. Nutt, 40, 1, S6, GCSL sur, 150 ft from n and e li nw¼ of nw¼.

JEFFERSON COUNTY—Corrected location. Gulf Prod. Co., Houston, C. W. Burrell, 232, 5, W. H. Smith sur, 1365 ft from s and 550 ft from w line.

LIBERTY COUNTY—V. H. Borsodi, Houston, Gulf, 5, 1, S 125, H&TC sur, 400 ft from n and 74 ft from e line. Cranfill & Reynolds, Houston, Esperson, 660, 8, C. W. Fisher sur, 400 ft n of No. 4. Esperson, 632, 9, M. Duncan sur, 100 ft from n and 300 ft from e line. Letts & Edwards, Houston, M. E. Davis, 10, 1, S 124, H&TC sur, se corner of lot 71.

LAVACA COUNTY—McElreath & Suggett, Fort Worth, J. E. Heinsohn, 125, 1, G. W. Scott sur, center.

LOVING COUNTY—L. E. Lockhart, Los Angeles, Fee, 80, 1, S 83, B 1, W&NW sur, 440 ft from n and w lines of sec.

MIDLAND COUNTY—Pure Oil Co., Fort Worth, J. E. Hutt, 664, 1, S 14, B 38, T&P sur, 330 ft from s and e lines of ne¼.

MONTAGUE COUNTY—Bridwell & Continental Oil Co., Wichita Falls, J. L. H. Brown, 100, 2, R. Graves sur, 150 ft from s and e lines of survey.

ORANGE COUNTY—Texas Co., Houston, Kuhn, 267, 2, M. E. Hall No. 2 sur, 589 ft from e and 150 ft from n line; Stark, 327, 2, M. E. Hall, No. 1 sur, 589 ft from e and 150 ft from s line.

PECOS COUNTY—Cosby Prod. & Royalty Co., Fort Worth, M. A. Smith, 20, 3, S 24, B 194, GC&SF sur, 330 ft from s and e line. O. J. Perren, Fort Stockton, H. J. Eaton, 40, 2, S 27, B 3, H&TC sur, center of ne¼ of sw¼. Continental Oil Co., Wichita Falls, I. G. Yates, 320, S43, S 60, B 1, I&GN sur, 2518 ft from w and 419 ft from s li e½. G.

### WEEKLY COMPARISON OF NEW WELLS

| State | Week ending Mar. 8 | Previous week | Total this month | Total this Year | This week 1929 | This month 1929 | 1929 Year Year |
|---|---|---|---|---|---|---|---|
| Arkansas | 3 | 2 | 5 | 25 | 7 | 9 | 159 |
| California | 12 | 18 | 30 | 151 | 35 | 68 | 1,231 |
| Louisiana | 21 | 65 | 86 | 184 | 10 | 31 | 903 |
| Kansas | 14 | 27 | 41 | 174 | 13 | 25 | 1,079 |
| Oklahoma | 61 | 65 | 126 | 505 | 51 | 100 | 3,578 |
| Texas | 163 | 164 | 327 | 1,418 | 146 | 291 | 8,697 |
| Total | 274 | 341 | 615 | 2,557 | 262 | 524 | 15,647 |

ALTEN'S

# 40 YEARS AT A SINGLE JOB

PERFECTING materials and devices to help you in the production of oil . . . watching these products in actual operation . . . concentrating our efforts to one industry—this has been our one and only job since 1889.

For forty years our efforts have been directed to making a line of quality products that would give better performance in the oil fields. To accomplish this purpose only the highest quality materials and skilled workmanship have been employed.

Today Alten products are known in every oil field for their superior construction and remarkable performance. Oil men everywhere depend on them to give perfect service and customers in all parts of the world admit their satisfaction by placing repeat orders when in need of additional equipment.

As the years pass, Alten products will continue to better and broaden the service for which they are built. And the name ALTEN will always signify QUALITY.

# ALTEN'S
## Foundry & Machine Works

Established 1889 LANCASTER, OHIO

ASK FOR ALTEN PRODUCTS AT YOUR SUPPLY HOUSE

H. Anderson, San Angelo, T. N. McKenzie, 80, 1, S 3, B 604, GC&SF sur, 330 ft from w and 480 ft from n li e¼ nw¼. Cardinal Oil Co., Fort Worth, J. H. L. Tippett, 160, 3, S 40, B 194, GC&SF sur, 1350 ft from s and 518 ft from w li. Southern Crude Oil Pur. Co., Fort Worth, J. H. Tippett, 75, 4, S 61, B 194, GC&SF sur, 150 ft from n and 982 ft from e line; 5, 150 ft from n and 1300 ft from e line. H. J. Eaton, 80, 1, S 35, B 3, H&TC sur, 1650 ft from sw and 330 ft from se li sec. World Oil Co., Inc., Fort Worth, University, 640, 2A, S 31, B 16, Univ. sur, 330 ft from n and w li nw¼ of ne¼. Phillips Pet. Corp., Bartlesville, Okla., S. H. Shearer, 640, 1, S 99, B 10, H&GN sur, 330 ft from s and e lines of s½.

PALO PINTO COUNTY—Transcontinental Oil Co., Tulsa, Okla., C. A. Dalton, 320, 1, 857 TE&L sur, 330 ft from s and e lines of sec.

SHACKLEFORD COUNTY — Sedwick, Webb & Midwest Expl. Co., Albany, Morris, 123, A1, S 192, E. T. Ry. sur, 3148 ft from e and 2580 ft from S li sec. Cranfill & Reynolds, Cisco, J. B. Matthews, 480, 4, S 31, E. T. Ry. sur. Hart & Gist Prod. Co., Albany, J. A. Clarke, 40, 2, S 2, Blind Asy. sur, 300 ft n of No. 1, sw¼ of ne¼. S. G. McClintock, RFD No. 1, Albany, J. A. Isbell, 100, 3, 818 TE&L sur, 340 ft sw of No. 1. Roser & Pendelton & Shamrock O&G Co., Albany, Scott, 640, 1, S 202, E. T. Ry. sur, 1300 ft from n and e lines of sec. L. D. Webb, Albany, B. S. Walker, 320, 1, 365 TE&L sur, 1717 ft from nw and 1720 ft from ne li sec. Midwest Exploration Co., Amarillo, W. Y. Davis, 80, 4, S 13, B 12, T&P sur, 1000 ft from s and 600 ft from e li w½ ne¼. Merrick & Lamb, Albany, J. B. Matthews, 80, 11, S 32, E. T. Ry. sur, 690 ft w of No. 8. F. W. Holder, Breckenridge, C. Compton, 40, 3, S 50, Blind Asy. sur, center. Roeser & Pendleton, Inc. & Continental Oil Co., Albany, Texas, W. I. Cook, A89, S 60, E. T. Ry. sur, 550 ft from e and 727 ft from s li nw¼.

STEPHENS COUNTY—Close Oil Co., Eastland, R. A. Elliott, 371 2, S 27, Bayland Asy. sur, 600 ft from n and 2000 ft from e line.

SAN PATRICIO COUNTY—Geo. B. Pickett, Corpus Christi, J. C. Baldwin, 160, 1, Thos. Carrol sur, 1398 ft from w and 1380 ft from s line.

THROCKMORTON COUNTY—Ewmo Oil Corp., Abilene, J. E. Hughes, 40, 12, 902 TE&L sur, 1083 ft from n and 140 ft from e li e½ ne¼. Wilson & Swain, Woodson, J. T. Odell, 40, 11, No. 696 TE&L sur, 1050 ft from w and 455 ft from s li s½ nw¼. N. Rosenbaum et al, Breckenridge, H. C. Welch, 40, 2, 907 TE&L sur, 329 ft s of No. 1; 3, 150 ft from n and 450 ft from e line. Deats & Ellis, Graham, E. R. Singleton, 120, 1, 2357 TE&L sur, 1500 ft from w and 200 ft from n line. C. & B. Oil Co., Breckenridge, J. E. Hughes, A, 40, 6A, 902 TE&L sur, 450 ft from s and 150 ft from w li se¼; 2A, 1140 ft from e and 750 ft from s li sec. J. A. Fowler, 80, 1, 906 TE&L sur, 150 ft from n and e line of nw¼. J. T. Odell, 40, 8B, 696 TE&L sur, 150 ft from n and e lines of sec. N. L. B. Davis, 40, 4, 901 TE&L sur, 150 ft from w and 750 ft from n li sec. Geo. Mollenkopf, Woodson, J. E. Hughes 40, 7, 902 TE&L sur, 2010 ft from e and 1710 ft from n li sec. Black Creek Oil Co., Olney, C. L. Downing, 60, 5, 908 TE&L sur, 300 ft s of No. 4. Young Bros. & Alexander, Inc., Fort Worth, H. C. Welch, 30, 4, 907 TE&L sur, 450 ft from e and 150 ft from s line; 3, 150 ft from n and 450 ft from w line.

TAYLOR COUNTY — Gibson & Adams, Abilene, A. B. Cody, 118, 2, GCSL sur, No. 120, 165 ft from e and 887 ft from s li blk 18.

TRAVIS COUNTY—H. W. Lightfoot, San Antonio, Flocher, 160, 2, 300 ft w of No. 1.

TITUS COUNTY—W. L. Murrell, Dallas, H. D. Walcott, 160, 1, D. M. Smith sur, 150 ft from n and e lines.

VAN ZANDT COUNTY—W. E. McKinney, Tyler, J. A. Bracken, 4, 1, Jno. Walling sur.

WICHITA COUNTY—W. C. Forbes, Fort Worth, M. M. Maywood, 148, 1, B 195, Wag. Col. sur, 900 ft from n and 500 ft from w line. Flynn Bros., Electra, Texas, G. L. Woodard, 240, 1, B 178, Wag. Col. sur, 660 ft from e and 960 ft from s line. Jeffers, Gilchrist & McGaughey, Burkburnett, Waats, 100, 4, BBB &C sur, 300 ft w of No. 1. Bonner Oil Co., Wichita Falls, Beach, 80, 51, No. 4, C. T. Ry. sur, 300 ft e of No. 47. Grayce Oil Co., Wichita Falls, Kemp & Kempner, 40, 30, W. G. Burton sur, 150 ft from n and 825 ft from w line. United Prod. Co., Wichita Falls, W. L. Hodges, 40, 11A, H&TB sur, 300 ft e of No. 10. Reno Oil Co., Wichita Falls, J. E. Roller, 80, 5, S. Holloway sur, 150 ft from n and w lines of blk 5. Jno. O'Neil, Wichita Falls, C. A. Crow, 20, 1, S 23, H&GN sur, 600 ft from n and 150 ft from w line.

WILBARGER COUNTY—McCarty Oil Co., Wichita Falls, R. L. Moore, 268, 1, S 37, B 4, H&TC sur, se corner. W. P. Anderson, Fort Worth, M. J. George, 46, 1, S 28, J. Poitevant sur, 150 ft from n and e lines. N. H. Martin, Wichita Falls, M. J. Gearge, 30, 3, B. 29, J. Poitevent sur, 200 ft from n and 150 ft from w line. Lido Oil Co., Wichita Falls, Waggoner, 10, 2, S 50, B 2, H&TC sur, 143 ft from e and 130 ft from s line. Dixie Oil Co., Inc., Electra, W. T. Waggoner, H, 120, 1, J. Bennett sur, 150 ft from n and 205 ft from e li sec. Texas Co., Wichita Falls, W. T. Waggoner, A376, S 4, B 13, H&TC sur, 1650 ft from n and 776 ft from e li sec.

WARD COUNTY—R. F. Owen, El Paso, H. Johnson, 80, 1, S 8, B 33, H&TC sur, 150 ft from n and 1100 ft from e li n½ n¼. Gulf Prod. Co., Fort Worth, G. W. O'Brien, 640, 8, S 18, B F, G&M sur, 330 ft from s and e lines of sec. Hutchings, 640, No. 4, S 7, Blk O, G&M sur, 330 ft from s and w lines of se¼. S. W. Richardson et al, Fort Worth, G. W. O'Brien, 170, 1, S5, blk F, GMMB&A sur, 330 ft from n and w lines of sec.

WILLIAMSON COUNTY—J. A. Thompson, Taylor, T. H. Martin, 20, 1, S. Miller sur, 150 ft from n and e lines. E. L. Chapman, Fort Worth, L. W. Fuchs, 74, 1, S. Miller sur, 280 ft from n and 178 ft from w line. Westheimer & Daube, Ardmore, Okla., R. L. Abbott, 57, 1, S. Miller sur, 150 ft from n and w lines.

WASHINGTONCOUNTY — Welfare Corp., Rockdale, J. F. Schramm, 70, 1, Jas. Walker sur, 873 ft from w and 593 ft from s line. W. D. Anderson, Fort Worth, L. Mueller, 148, 1, S. F. Austin sur, 150 ft ne of center of sw line.

WHEELER COUNTY — Fain-McGaha & Murchison Oil Co., Wichita Falls, W. L. Cooper, 80, 2, S 80, B 23, H&GN sur, 660 ft from n and e lines of nw¼.

WEBB COUNTY—O. W. Killam, Laredo, A. M. Bruni, 160, 1, Albercas sur, 575 ft from n and 238 ft from e li blk. 33; A. M. Bruni, 500, 18, S 9, M. Arispe sur, 400 ft from ne and 451 ft from se li sec.

WILSON COUNTY — Empire G&F Co., Bartlesville, Okla., J. R. Shook, 300, 1, V. Zepeda sur, 1400 ft from sw and 400 ft from se line.

## ARKANSAS

UNION COUNTY—Simms-Sun-Marine Oil Co., Simmons 1-A, 10-18-13, 200 ft n and 200 ft w of se cor of nw¼.

OUACHITA COUNTY—Magnolia Pet. Co., P. C. Grayson (drill) 2, 21-15-19, 150 ft n and 200 ft w of se cor se¼ ne¼.

SEBASTIAN COUNTY—Lavaca Oil & Gas C., Fannie Braley (drill) 7, center of nw¼ nw¼.

## LOUISIANA

LOUISIANA PERMITS ... ... ... ... ... .....

BOSSIER PARISH—Arkansas Fuel Oil Co., Shreveport, Bolinger 2, 38-23n-11w, 330 ft s and 330 ft w of ne c Lot 26. Eyelers O. & G. Co., Shreveport, Wise 1, 35-23n-12w, 330 ft s and 330 ft w of ne c of sec. Magnolia, Shreveport, L. Matlock 2, 25-23n-12w, 320 ft s and 330 ft w of ne c se sw. John Woodley, Inc., Shreveport, J. J. Roberson 1, 22-23n-12w, 330 ft n and 330 ft w of se c sw ne.

CADDO PARISH—Bayou State Oil Corp., Shreveport, Barr 2, 30-22n-15w, 320 ft w and 170 ft n of se c nw se. Gulf, Shreveport, Levee Board A-25, 34-21n-16w, 1520 ft s and 200 ft e of nw c of sec. Robinson & Greer, Shreveport, Wilson 1, 2-15n-16w, 330 ft n and 330 ft w of se c n½ se.

CALCASIEU PARISH — Rex. Pet. Corp., Vinton, Hunter 11, 21-9s-11w, 470 ft w and 43 ft n of se c of sec. Texas-Gulf Sulphur Co., Vinton, Lutcher-Moore 14, 19-9s-12w, 490 ft w and 200 ft n of se c sw.

IBERIA PARISH—The Texas Co., Shreveport, State-Vermilion Bay 5, 15s 5e, 15736 ft w and 6607 ft s of se c sec. 20-15s-6e.

RICHLAND PARISH—La. Gas & Fuel Co., Shreveport, Mulhern A-1, 32-17n-6e, 1731 ft n and 2242 ft e of sw c nw. United Carbon Co., Monroe, Mulhern 2, 30-16n-6e, 660 ft s and 760 ft e of nw cor of nw¼.

SABINE PARISH—Broderick & Calvert, Ft. Worth, Texas, Sabine Lbr. Co. 1, 31-8n-12w, 805 ft e and 150 ft n of center of sec. Tom David, Many, La., D. Nevels 1, 31-8n-12w, 300 ft n and 275 ft w of se c nw sw. Dooley & Howard et al, Shreveport, Ike Williams 1, 31-8n-12w, 805 ft n and 40 ft w of se c sw ne. R. L. Gay, Tr., Zwolle, Bowman-Hicks 7, 14-7n-14w, 200 ft n and 200 ft w of se c ne sw; Bowman-Hicks 8, 18-7n-13w, 330 ft n and 330 ft w of se c nw sw. C. L. Jett, Tr., Zwolle, Jones 1, 31-8n-12w, 844 ft n and 371 ft w of se c sw ne. W. S. Smith, Shreveport, Colquitt 1, 31-8n-12w, 500 ft s and 480 ft e of nw c sw ne; Henderson 1, 31-8n-12w, 200 ft s and 300 ft e of nw c se se. Ben Youngblood, Zwolle, Sabine Lbr. Co. 1, 31-8n-12w, 150 ft n and 150 ft w of center of sec.

## CALIFORNIA

BELRIDGE—Continental Oil Co., Result 1, 36-27-20.

COYOTE HILLS—Graham-Loftus Oil Co., No. 1, 18-3-9.

FRUITVALE—Shell Oil Co., Moore 1, 21-29-27. Superior Oil Co., Scheel 1, 28-29-27.

LONG BEACH—Petroleum Securities Co., Painted Hills 1, 29-4-12. The McKeon Oil Co., No. 7, 29-4-12.

PLAYA DEL REY—Union Oil Co., Del Rey 1, 28-2-15.

SANTA BARBARA COUNTY—E. R. Rich, No. 178-1, 4-4-80.

SUNSET — Universal Consolidated Oil Co., No. 1-B, 7-11-23. Barnsdall Oil Co., No. 3, 17-11-23.

TULARE COUNTY—Ducor Pet. Co., No. 1, 14-24-27.

VENTURA COUNTY—Shell Oil Co., Everett 2, 14-2-20.

## OKLAHOMA

BECKHAM COUNTY — Roy Johnson, Brewer 1, c nw, 29-10-22w.

CADDO COUNTY—Ramsey Pet. Co., Wade 8, nw c sw (owdd) 2-5-9w.

CARTER COUNTY—Venmex Oil Co., Miller 1, sw c, 29-1s-3w.

COTTON COUNTY—Harris and McNeal, Chambers 1, sw c nw, 1-2s-10w . Shasta Oil Co., Tan-Nah 1, (owdd), sw c ne, 31-1s-9w.

CREEK COUNTY—George Whittman et al, Smith 1, ne nw sw, 11-14-10e. McGraw Oil Co., McIntosh 1, sw c, 15-16-11e. Tom Steele et al, Bernstein 1a, nw c ne se, 8-16-11e. F. B. Murta et al, Page 1a; sw c se sw nw, 34-16-103. J. E. Martin et al, Bruner 1, c sw nw, 27-17-13e. Chestnut and Smith, Boling 1, se nw sw, 27-17-12e. Central Commercial Oil Company, Hay 3, sw nw sw, 10-17-10e.

GRADY COUNTY—Tom B. Nichols, Burgis 1, c ne nw, 34-5-8w.

LINCOLN COUNTY—T. B. Slick Oil Co., Hammer 1, se c nw, 35-16-2e.

MARSHALL COUNTY — F. W. Merrick, Null 4, nw c se nw, 24-5s-5e. Bilbo Oil Trust Co., Taliaferro 5 "B," nw c ne se se, 14-5s-5e. W. A. Neff et al, Crouch 1, sw c nw se, 11-5w-5e.

MUSKOGEE COUNTY — W. H. Hooker, Townlot 1, sw sw sw, 27-15-18e. Robinson Bros., Lewis 5, c nw ne, 8-13-16e. C. O. Buckles, Lowery 1, nw c sw, 9-15-15e, (owdd).

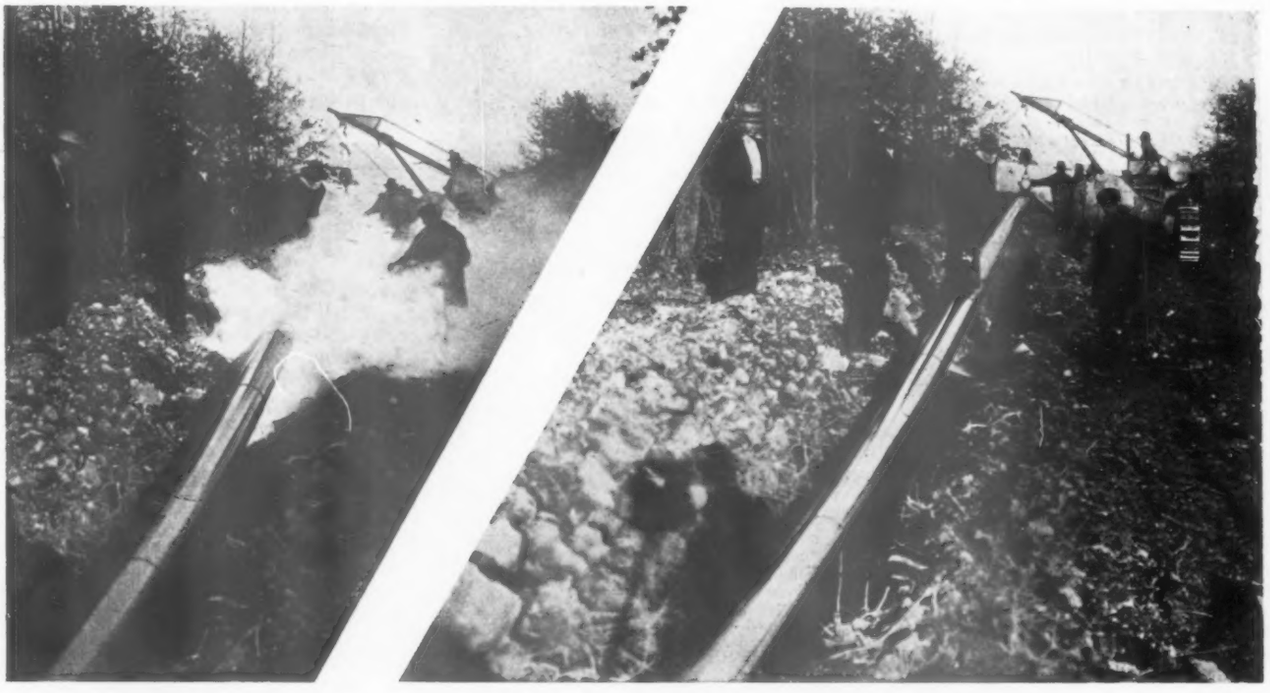
OKFUSKEE COUNTY — Sunray Oil Co., Wilson 1, (owdd) nw c se, 22-12-11e.

OKLAHOMA COUNTY—W. R. Reynolds et al, 1, sw c nw sw, 1-11-3w. Cromwell-Franklin Oil Co. et al, Trosper Park 21, nw c, 13-11-3w; Trosper Park 22, sw nw nw 13-11-3w. I.T.I.O. Co. et al, Trosper 1, ne c 14-11-3w; Trosper 2, se ne ne, 14-11-3w. Wirt Franklin Pet. Corp. et al, Lowery 8, se ne nw, 12-11-3w, Cromwell-Franklin Oil Co. et al, Trosper Park 23, se c nw, 12-11-3w. I.T.I.O. Co. et al, Canfield-Burton 3, nw ne sw, 19-11-2w; Button 5, ne nw sw, 19-11-2w; Farley-Fuzzell, sw se nw, 19-11-2w; M. Fuzzell 3, se sw nw, 19-11-2w.

OSAGE COUNTY—Cities Service Gas Co.,

# JUST 100 FT. 10-INCH

## Here Is a Job Finished 23 Days Ahead of Schedule With No Repairs Needed For the Winch or Tractor



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**WICHITA, KANSAS**

***Manufacturers of Oil Field Auxiliary Equipment for "Caterpillar" Tractors***

No. 93, sw sw sw, 17-25-8e. Peters Pet. Co. et al, 1, sw c se, 22-25-9e. Cities Service Gas Co., 92, c nw nw, 15-26-9e.

PAWNEE COUNTY — Cimarron Oil Co., Smelser 2, nw c, 29-20-9e.

PITTSBURG COUNTY — Central States Light & Power Co., Carney 1, se c ne, 9-7-18e.

POTTAWATOMIE COUNTY—Pure Oil Co. et al, Caulding 1, ne se nw, 19-9-5e.

SEMINOLE COUNTY — The Texas Co., Lewis 3, nw se nw, 13-5-7e. M. H. Watt et al, Gilroy 1, se c ne, 4-8-83. Magnolia, Scipio 2a, sw nw nw, 4-7-7e; Wisey 2, nw ne sw, 9-6-6e; Palmer 1, nw ne se, 31-6-8e; Saketka 1, nw sw ne, 31-6-8e; Palmer 1, ne se sw, 31-6-8e. Burke-Greis Corp., Powell 1, sw ne se, 7-9-6e. Mid-Continent Pet. Corp., Ground 1, nw ne ne, 23-9-5e. Amerada Pet. Corp. et al, Ground 3, ne nw nw, 23-9-5e; Edwards 3, nw ne ne, 22-9-5e. Dixie Oil Co., Lena 2, sw se se 15-9-5e. Dixie, Lena 1, se c 15-9-5e.

STEPHENS COUNTY—Crane and Rankin, Brown 1, nw c ne, 23-1n-9w (owdd). Amerada Pet. Corp., Hanson 8, se sw sw, 12-1s-4w. Shasta Oil Co., Patterson 2, sw c nw nw nw, 1-2s-10w. George Pace et al, Wilson 1, nw c sw nw ne, 20-2s-7w. Wirt Franklin Pet. Corp., Spain 3, se sw nw, 9-2s-6w.

TILLMAN COUNTY — Bridwell Oil Co., Rutherford 1, ne c se, 11-4s-16w.

TULSA COUNTY—H. C. Dean et al, Grayson 1, sw se sw, 20-19-14e. R. E. Downing, Marshall 1, se c ne ne, 35-19-14e. Murray et al, Bruner 1, se c ne, 20-19-14e. L. E. Lockhart, Brown 1, se c sw, 5-16-14e.

## KANSAS

BARBER COUNTY—Barbara Oil Co., Alexander 1 "B,' 'ne sw sw, 7-33-12w.

BUTLER COUNTY—Davidson et al, Phillips 1, nw c sw, 18-27-4e.

COWLEY COUNTY — Roth and Faurot, Adam 1, sw ne ne, 19-32-8e. Crow et al, Conrad 1, se c ne, 8-32-5e.

ELK COUNTY—Union Gas Corp., Ware 1 (owdd), c ne ne, 5-31-9e.

GREENWOOD COUNTY—Sinclair, Beavers 1, se ne sw, 25-24-12e. Derby Oil Co. et al, Burke 1, ne nw nw, 26-23-8e. Phillips Pet. Co. et al, Miller 1, ne c nw, 2-25-10e. Derby Oil Co., Beavers 1 "A," ne se sw, 25-24-12e. O'Neil et al, Harland 1, ne nw nw, 34-22-11e. Lewis et al, Errickson 1, se nw se, 17-24-13e.

RUSSELL COUNTY — Jamot Brown et al, Baumrucker 1, ne nw sw, 8-14-15w. Empire, Dillner 1, nw c, 36-13-15w.

SEDGWICK COUNTY—Wentz Oil Corp., Bright 1, nw se nw, 1-26-1w.

# Unusual Substance Found in Colorado Test

Denver, Colo.—The Nettie M. Slatt well in Adams County, near Watkins, is reported to have made an interesting discovery at 1050 feet where the well is now drilling, carrying a string of 12½-inch casing to be set when suitable seat is found. This test has had 16 water sands from the surface to 950 feet, but since there, there are none reported, although the water is not yet cased off. At 1010 feet the company reported a black substance about the consistency of mush which smeared up the cable and came out in the bailer in small chunks. Samples have no odor, but rubbed between the fingers, turn to a brownish cast and become satiny in feel and appearance. Heated they give off an odor similar to that of sheep's wool. Lighted they splutter and burn. It looks much like a residuum of black oil, but it is claimed that analysis shows a high content of ichthyol.

## COMPLETIONS

(Continued from Page 256)

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| Iron Mountain Oil Co., John 1, se c, 4-17-10e | ¶3½ | 1052 |
| Curtis Oil Co. et al, Allen 1, se ne ne, 27-16-10e | * | 3122 |
| Texas Company, Lawson 1, ne c nw, 20-17-10e | * | 2651 |
| C. O. Buckles et al, King 1, c se sw, 18-17-10e | * | 2172 |
| MARSHALL COUNTY— | | |
| Magnolia, Coatsworth 1, sw c se se se, 30-5s-6e | * | 927 |
| Lee et al, Hillburn 1, se ne se, 22-5s-5e | * | 610 |
| MUSKOGEE COUNTY— | | |
| C. O. Buckles, Barnett 9, (owdd) ne c se 8-15-15e | 50 | 1672 |
| W. J. Metzger, Taylor 2, ne c se, 14-14-18e | * | 1460 |
| Seminole Pet. Co., Murrell 1, nw c se se 16-15-18e | * | 2425 |
| H. E. Williams, Davidson 1a, (owdd) cnl se sw 24-15-17e | * | 1452 |
| OKFUSKEE COUNTY— | | |
| Independent Oil & Gas, Wilson 2, se sw nw 22-12-11 | 25 | 3500 |
| Champlin Refg. Co., Jacobs 15, nw se se 15-11-11e | 15 | 2520 |
| R. L. Walker et al, Tarvin 1a, cel se nw, 3-11-11e | * | 2311 |
| OKLAHOMA COUNTY— | | |
| Wirt Franklin Pet. Corp. et al, Lowery 3, sw nw nw 12-11-3w | 15,029 | 6432 |
| Wirt Franklin Pet. Corp. et al, Lowery 4, cwl e½ nw, 12-11-3w | 8208 | 6361 |
| Indian Territory Illuminating et al, E. Fortson 3, ne se ne, 24-11-3w | 22,938 | 6521 |
| Indian Territory Illuminating, et al, Henning 2, sw e se, 24-11-3w | ¶50 | 6420 |
| Indian Territory Illuminating Oil, et al, Jones 1, nw c, 31-11-3w | 6240 | 6519 |
| Indian Territory Illuminating, et al, Farley-Fuzzell 1, se c nw, 19-11-2w | 29,990 | 6501 |
| Sinclair Oil & Gas, and Amerada, Kinter 1, (owdd), nw c se, 30-11-2w | 1005 | 6351 |
| OKMULGEE COUNTY— | | |
| Carter Oil Co. et al, Chamberlain 2, ne nw ne 3-14-12e | ¶10 | 1945 |
| T. W. McCurry, Stake 1a, sw c ne nw, 19-13-15e | * | 1328 |
| OSAGE COUNTY— | | |
| Peters Pet. Co. and Producers & Refiners Corp., 9, ne se se, 22-27-11e | 50 | 1712 |
| PAWNEE COUNTY— | | |
| Martin et al, Cotton 5, csl ne sw 6-20-8e | 180 | 2633 |
| Devonian Oil Co., Copeland 3, csl se sw 26-20-9e | * | 3113 |
| PAYNE COUNTY— | | |
| Shaffer Oil & Refg., Little Chief 4, se nw nw, 4-18-5e | 400 | 3497 |
| Shaffer Oil & Refg., Miller 1, ne c 20-19-5e | 130 | 3863 |
| PONTOTOC COUNTY— | | |
| Denver Producing & Refg., Roberts 2, ne se ne, 36-5-4e | 45 | 2635 |
| Skelly Oil Co. et al, Boykin 1, se sw se, 14-5-7e | * | 4386 |
| POTTAWATOMIE COUNTY— | | |
| Magnolia Pet. Co., Tartar 1, (owdd) sw nw sw 15-7-4e | 233 | 4230 |
| Atlantic Oil Producing Co. et al, McGee 1, ne nw se, 4-7-4e | 2265 | 4000 |
| Gypsy Oil Co., Duvall 1, ne c sw, 3-7-4e | 530 | 3959 |
| Independent Oil & Gas, et al, Weldfelt 3, ne sw nw 2-7-4e | 260 | 3825 |
| Amerada Pet. Corp., Smith 2, sw ne ne, 8-8-5e | 300 | 4049 |
| Continental Oil Co. et al, Branderburg 1, se c, 34-8-4e | 405 | 3982 |
| SEMINOLE COUNTY— | | |
| Magnolia, Reed 4, ne c se, 13-5-7e | ¶15 | 2789 |
| McCulloch Oil Co. et al, Culley 1, nw ne sw, 16-6-6e | 720 | 2932 |
| E. L. Harris et al, Harjoche 4, sw se se 8-6-6e | 1375 | 2932 |
| Gypsy Oil Co., Barhan 1, ne c se, 8-6-6e | 340 | 2863 |
| Magnolia, Coker 1, sw c se, 13-7-6e. | 430 | 4186 |
| Carter Oil Co., Campbell 2, sw nw sw, 20-9-6e | 1970 | 4210 |
| Carter Oil Co., Chowning 2, nw sw sw, 19-9-6e | 3910 | 4184 |
| Amerada Pet. Corp. et al, Edwards 1, se ne ne, 22-9-5e | 8170 | 4214 |
| Reiter-Foster Oil Corp., Bunyard 4a ne nw sw, 14-7-6e | * | 3382 |
| STEPHENS COUNTY— | | |
| Atlantic Oil Producing Co., Taylor 4, se sw nw, 12-1s-4w | 200 | 3767 |
| TULSA COUNTY— | | |
| L. L. Boyd, Horn 1a, se c nw, 23-18-14e | 5 | 1562 |
| Little Ed Oil Co., McKim 3, ne c se 30-17-14e | * | 1435 |
| Scott and Christie, Billy 1, sw se ne, 32-17-14e | * | 1496 |
| Gilbertson et al, Fields 1a, se c nw se, 21-16-14e | * | 2045 |
| WAGONER COUNTY— | | |
| Union Oil Co., McKellop 1a, nw ne nw, 25-18-15e | * | 1135 |
| W. H. Bauder, Sherlay 1a, se c ne, 7-19-15e | * | 1310 |
| WOODWARD COUNTY— | | |
| Harris and Haun, Wyatt 1, c se, 9-23-20w | * | 5660 |

## New Construction Ideas Used Across Hudson River

(Continued from Page 71)

When these three simultaneous operations were finished, 80 feet of pipe were laid out and a new length started at the bow. The barge was moved ahead by means of a pile driver, using lines attached to anchors set in position along the line of crossing. About 1¼ hours were required for the welding and testing and the shifting of the barge took about three-fourths of an hour, under ordinary conditions, so that 800 to 1000 feet of pipe could be laid per 24-hour day.

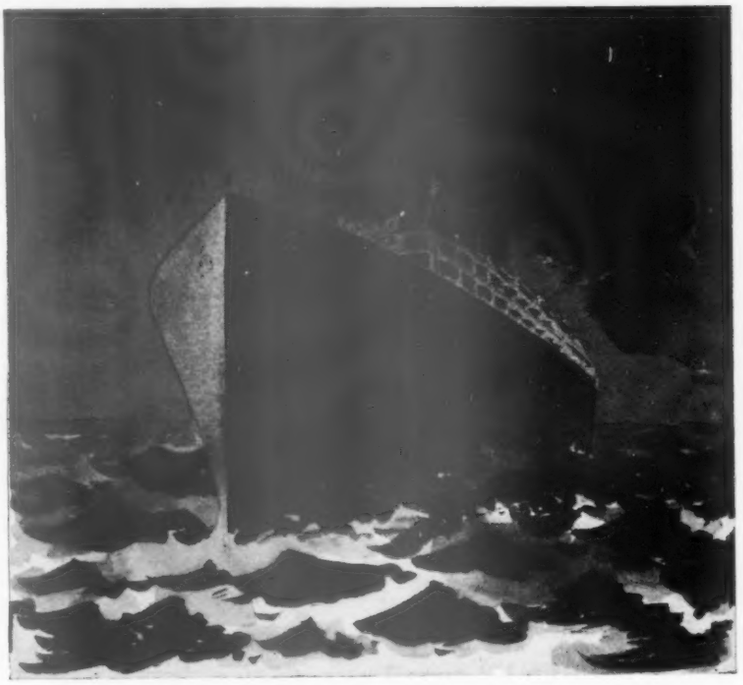
To reduce the stress in the unsupported portion of the pipe extending from the stern of the barge to the river bed, eight pontoons placed 40 feet apart were kept attached to this portion of the line. These were welded steel oil storage drums each having a capacity of 120 gallons and a buoyant effect of 880 pounds. The pontoons were attached to the pipe by means of hooks in such a way that they could be released by pulling a cord attached to a float at the surface. Each time the barge was moved forward 80 feet, the last two pontoons were released and returned to the barge to be used again.

When the crossing was started the men were required to work on alternate eight-hour shifts, but it was later found advisable to change this arrangement to alternate 12-hour shifts.

With the tide and wind conditions encountered, expert seamanship was required at times for the task of moving the barge along the predetermined line. The barge was held in place and moved by the use of six anchors, and more were held in reserve for use when wind and tide conditions became dangerous. On two occasions a wind storm, followed by rain and high seas, held up the operation, delaying the job a total of 40 hours. In spite of this the crossing was completed in 11 days and seven hours.

The completed river crossing was tested and found tight by requiring the line to hold 150 pounds per square inch pressure for 12 hours without loss being shown on a recording gauge.

# A Drilling Well Without A CONTROL CASING HEAD

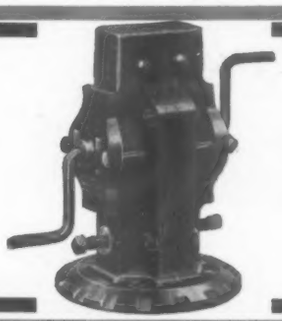


## *is Like a Ship Without a Rudder*

*Another "Case of Good Judgement"*
The ravages of this fire could not penetrate the "fire wall" provided by this O.W.I. Control Casing Head. Another good producer saved.

TYPE "D" Latch Assembly Control Head

**No ship-owner would risk human lives and property by operating a ship without the only device which can enable it to hold a safe course through the perils to navigation. And modern oil and gas operators refuse to endanger both lives and property by allowing any well to be drilled without the protection afforded by the O. W. I. Control Casing Head —the only device which can give the driller instant and complete mastery over any oil flow or gas pressure which may be encountered.**



*Type "D" Double Roller Oil Saver*
With combination base which makes Oil Saver interchangeable for use in either set screw top or latch assembly Control Heads. Many other improvements give great strength, durability and efficiency.

We also manufacture Chambered Control Heads, Casing Heads, Apex Polished Rod Stuffing Boxes, and high pressure fittings for oil and gas wells and pipe lines. Write for catalog and quotations.

THE OIL WELL IMPROVEMENTS CO.
Tulsa, Okla.

# WILDCATS FROM ALL SECTIONS

## WEST TEXAS

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| COKE COUNTY— | | |
| Mid-Kansas O&G Co., Lackey 1... | * | 4255 |
| FISHER COUNTY— | | |
| Magnolia Pet. Co., Alice Lee 1..... | * | 5680 |
| GAINES COUNTY— | | |
| Cranfill-Reynolds Co. & La. Oil Ref. Corp., Ralph 1 ..... | * | 4750 |
| IRION COUNTY— | | |
| Atlantic & Beasley, Sawyer 1 ..... | * | 1950 |
| LOVING COUNTY— | | |
| Humble O&R Co., Unit Plan, Kloh 1-C ..... | * | 4085 |
| NOLAN COUNTY— | | |
| Gibson & Johnson, S. P. Boyd 1 ... | * | 3285 |

ANDREWS COUNTY—Deep Rock Oil Co. et al's A. R. King 1, dr 915 ft; B. L. King 1, set cas 765 ft; W. J. Mathis 1, dr 490 ft. Fuhrman Pet. Corp.'s W. T. Ford 1, dk.

BORDEN COUNTY—W. A. Moncrief & Humble O&R Co.'s Munger 1, elev 2433 ft, top salt 1090 ft, top lime 2778 ft, dr 3000 ft. Phillips Pet. Co. & C. B. Shaffer's Good 1, dr 275 ft.

BREWSTER COUNTY—E. L. Chapman et al's Skinner 2, dr hfw 1200 ft. Trans-Pecos O&G Co.'s Jones 1, elev 3073 ft, dr 1995 ft.

COCHRAN COUNTY—R. A. Westbrook & Co.'s Slaughter 1, sd to abn 5036 ft.

COKE COUNTY—Arkansas Fuel Oil Co. & Dixie Oil Co.'s W. A. Stepp 1, rig. Cates & Fitzhugh's Mims 1, machine.

CONCHO COUNTY—J. L. Duffy & Watchorn O&G Co.'s L. Noyes 1, elev 1965 ft, lcn.

CRANE COUNTY—Cranfill Bros. Oil Co.'s J. B. Tubbs 1, dk.

CROCKETT COUNTY—Empire Gas & Fuel Co.'s Shannon 1, sd 2660 ft. California Co.'s Shannon 2, elev 2667 ft, lcn. Magnolia's Hoover 1, elev 2412 ft, top salt 660 ft, trace heavy oil 1535 ft, dr 1875 ft.

CULBERSON COUNTY—Grisham-Hunter Corp.'s W. D. Garren 1, machine; Seay 3, elev 3634 ft, top Delaware 2934 ft, top salt 2730 ft, sd after gas fire 2995 ft. Hickey & Stevens' Finley 1, dr 2780 ft. W. L. Kornrumpf et al's Garron 1, sp and sd.

ECTOR COUNTY—Cosden Oil Co.'s University 2-A, sp; University 2-B, fsh 830 ft; Kloh 1, dr 610 ft. C. P. Davis et al's Hendrick 1, co 800 ft. Gibson-Johnson & Eastland Oil Co.'s Scharbauer 1, rig. Gulf Prod. Co.'s Kloh 1-G, rig; University 1, top salt 925 ft, dr 1335 ft; University 1-A, top salt 1175 ft, dr 1280 ft. Humble-Penn-Atlantic's Kloh 2-D, top salt 1050 ft, dr 2055 ft; Kloh 3-D, dr 890 ft; Kloh 4-D, dr 625 ft; Kloh 5-D, 6-D and 7-D, rigs; R. L. York 2, elev 2902 ft, top salt 1115 ft, dr 2590 ft; York 3, top salt 1190 ft, dr 2265 ft; York 4, dr 430 ft; York 5, dr 655 ft; York 6, dr 744 ft. Independent O&G Co. & Tidal Oil Co.'s Eidson 1, rig. Landreth Prod. Corp.'s University 2-S, dr 910 ft; University 2-T, top salt 1216 ft, running cas 3328 ft. Llano Oil Co.'s Hogan 1, elev 2914 ft, top salt 1390 ft, top lime 3349 ft, top white lime 3485 ft, sd in sulphur water 3838-43 ft. Penn Oil Co. & Devonian Oil Co.'s Goodman 1, lcn. Shell Pet. Corp.'s Jones 1, rig. Simms Oil Co. & M. H. Reed's University 1, rig. Skelly Oil Co. & Amerada's University 1, rig. TP Coal & Oil Co.'s B. W. McKenzie 1, lcn. H. F. Wurtz et al's E. A. Ibbetson 1, sp and sd.

EDWARDS COUNTY—Phillips Pet. Co.'s Holman 2, rig.

FISHER COUNTY—Cranfill-Reynolds Co.'s Johnson 1, dr 1725 ft; Willingham 2, rig.

GARZA COUNTY—H. C. Cate & Pandem Oil Corp.'s Stoker 1, sd 3018 ft.

GLASSCOCK COUNTY—California Co.'s J. W. Baker 1, rig; Jones 1, dk. Conoco's Miller 1, cemt cas 1449 ft; Phillips 1, cemt cas 2122 ft. FHE Oil Co.'s Cox 1, dr 1720 ft. Luna Oil Co.'s Edwards 1, elev 2548 ft, top lime 2155 ft, pb from 2491 to 2295 ft. Ed Timberlake & Snyder's Meek 1, elev 2792 ft, sd 2025 ft.

TOM GREEN COUNTY—Phillips Pet. Co. & Sun Oil Co.'s A. Gulden 1, rig.

HOWARD COUNTY—Meriwether Oil Co.'s Smith 1, elev 2590 ft, ur 2275 ft. Owen-Sloan Co. et al's Flowers 1, elev 2497 ft, sd 2517 ft.

HUDSPETH COUNTY — California Co.'s University 1, elev 5109 ft, dr gray lime 3935 ft.

IRION COUNTY—Baker & Hodges' Tankersley 2, sd 1450 ft. Banner Oil Co.'s Nutt 2, lcn. J. B. Crawford et al's Nutt 1, sd 1105 ft. Carl Cromwell et al's Nutt 2, sd 455 ft. Irion Oil Co.'s Tankersley 1-A, sd 200 ft. Kingwood Oil Co. et al's Suggs 1, elev 2334 ft, sd after 4 shots, td 7818 ft. J. A. Starkweather et al's Lindley 1, dr 2975 ft. P. H. Williams et al's Ashe 1, elev 2726 ft, top lime 1712 ft, co 7705 ft.

JONES COUNTY—Atkinson & Sandefer's Byron 1, dr 625 ft. Mid-Tex O&G Co.'s King 1, dr 1770 ft. Phillips Pet. Co.'s Coates 1, rig. W. S. Ware & W. G. Clark's Neuman 2, elev 1815 ft, testing good show oil, td 2533 ft.

LOVING COUNTY—California Co.'s Allen 1, dr 125 ft; Reagan-McElvain 1, rig. Hadlock et al's Ramsey-Russell 2-A, rig. Lockhart & Co.'s Bowen-Wells 3, dr 135 ft; Hubbard 5, elev 2695 ft, swab 35 bbls 28 gravity oil daily 2305-08 ft; Lepp 2, sp and sd; Wheat & Ramsey 1, rig; Wheat 1-H, elev 2713 ft, top Delaware 4152 ft, top black lime 5025 ft, bad hole 5040 ft.

LYNN COUNTY—Hart Oil Corp. et al's Edwards 1, sd 5035 ft.

MENARD COUNTY — Cromwell & J. L. Duffy's Winslow 2, elev 2143 ft, ur 1530 ft. L. G. Priest et al's J. P. Sorrell, dr 815 ft.

MIDLAND COUNTY—Pure Oil Co.'s J. E. Hutt 1, sp.

MITCHELL COUNTY—Gibson & Johnson's Scott 3, elev 2091 ft, top salt 739 ft, dr 1350 ft. Magnolia's Snyder 1, abn 3270 ft. Teas & Wheeler's Radford 1, elev 2223 ft, dr 4855 ft.

PECOS COUNTY—Angelo Pet. Inc.'s McKenzie 1, dr 400 ft. Atlantic Oil Prod. Co.'s Shearer 1, flowing oil by heads 1438-45 ft. E. L. Chapman et al's Streety 1, elev 2653 ft, ur 1905 ft. Cranfill-Reynolds Co.'s Masterson 1-B, elev 2460 ft, dr 1715 ft. Cromwell-Tanner & Ellis' University 1, machine. Crosby Prod. & Royalty Co.'s Cordova 1, dr 415 ft. Dixie Oil Co.'s McKenzie 1, elev 3172 ft, top salt 1410 ft, dr 2460 ft. Fisher & Lowrie's Webb 1, lcn. Galt-Brown Co.'s Thompson 1, sp. Hayes et al's A. N. Lea 1, lcn. Humble O&R Co.'s Cunningham 2, elev 2948 ft, top salt 1060 ft, top lime 1686 ft, dr 1900 ft. Hussman Oil Co.'s Estes 1, fsh 1420 ft. Independent O&G Co.'s Jasper 1, lcn. Kennedy et al's Kennedy 1, elev 3217 ft, top salt 2705 ft, sd 3132 ft. Mauch & Krogen's Holmes 1, sd 2175 ft. Messenger et al's Byrne 1, rig. J. R. Miller et al (was E. W. Bennett's) Bennett 1, sp and sd. R. E. Moore et al's Arnold 1, elev 3860 ft, sd 1615 ft. Pecos Valley Crude Oil Pur. Co.'s Pecos Valley 4, co after shot, td 1650 ft. Perren et al's Eaton 2, machine. Phillips Pet. Co.'s Shearer 1, machine. R. W. Porpus et al's State 1, lcn. Rector Oil Co.'s Young 1, sp. Sides & Cloyd's Blackstone-Slaughter 1, sd 770 ft. Southern Crude Oil Pur. Co.'s Eaton 1, lcn; McKenzie 1, elev 2800 ft, top salt 975 ft, sd hfw 2315 ft. Stine & Griffith's McKenzie 1, elev 3156 ft, top

### ABBREVIATIONS

NOTE—The following is the explanation of abbreviations, signs, etc., used in completion and wildcat reports: *—dry hole, abandoned well; ‡—salt water; †—junked and abandoned; ¶K million feet of gas; abn—abandoned; bbls—barrels; b.s.—basic sediment; cas—casing; co—cleaning out; dk—derrick; dr—drilling; fsh—fishing; ft—feet; in.—inches; lcn—location; m—milling; n, s, e, w—north, south, east, west; r—reaming; sd—shut down; sdtr—s'detracking; sp—spudding; sr—straight reaming; std—standardizing; sw—salt water; td—total depth; ur—underreaming; wo—workover; wosr—waiting on standard rig.

*South Dakota had the novelty of a free filling station along with the thrill of new oil production recently, when oil from the state's first oil well was put "on tap" at Hot Springs. Perhaps the cop is getting a sample to determine if it complies with the prohibition act. Photo by Otto C. Huber*

*View of pipe line job in Missouri*

PIPE LINE CONTRACTOR

# HENRY L. LEMONS, Inc.

*The Philtower*

TULSA, - - - OKLAHOMA

*Batteries of 1500-bbl. and 1000-bbl. Maloneys on I. T. I. O. Thomas Fuzell lease, Oklahoma City. Erected by distributer Maloney Sales Corporation.*

# Common Sense Demands Conservation of Your Resources

Hundreds of operators are spending money for oil production—and then allowing the oil to be needlessly wasted by the breathing of lease tanks. Common sense demands the use of tanks which *eliminate* this unnecessary waste.

Our Vapor-Pressure Stock and Flow Tanks restrict the breathing which dissipates valuable oil and gas into the atmosphere. It is plain common sense to use tanks which conserve your resources and increase your net income.

*"Alone in Quality"*
MALONEY TANK MFG. COMPANY
Tulsa, Oklahoma
*Distributers at All Principal Petroleum Points*

Maloney A. P. I. Bolted Steel Tanks conform to A. P. I. dimensional standards and carry the official A. P. I. monogram.

MADE OF KEYSTONE AMERICAN

MALONEY PATENTED BOLTED COPPER-STEEL TANKS

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salt 1330 ft, dr 2615 ft. The Texas Co. et al's Wright 1, dr 130 ft. Trees Oil Co.'s Trees 3, sd 1423 ft. Transcontinental Oil Co.'s University 1, elev 2552 ft, top lime 1035 ft, bad hole 4910 ft; White-Baker 2, elev 2695 ft, top salt 875 ft, hfw and dr 1710 ft. W. F. Walsh et al's Scharbauer 1, lcn. World Oil Co.'s University 1-C, elev 2614 ft, sd hfw 1763 ft.

REAGAN COUNTY—Big Lake Oil Co.'s University 179 (deep est) ur 11¾-in cas 2575 ft; University 1-C, cemt cave 8430 ft and installing rotary; University 2-C, flowing 676 bbls 56.6 gravity oil and 12½ mil ft gas, td 8232 ft; University 3-C, trying to drill in shale and calsite 8540 ft; University 4-C, flowing 122 bbls 58.1 gravity oil and 5,196,000 ft gas, td 8220 ft. Group One Oil Corp.'s University 2-B, dr 5880 ft; University 3-B, dr shale 4305 ft. A. M. Hagan & John W. Emch's Sawyer 1, lcn.

REEVES COUNTY—Hansford et al's Williams 1, sd 380 ft. Slack & Fink's Brooks-Huling 1, sd 1780 ft.

RUNNELS COUNTY—Geo. W. Boyce & Lamar's Lange 1, elev 1844 ft, set cas 2360 ft. Gibson & Johnson's Johnson 1, dr 1360 ft.

SCHLEICHER COUNTY — Delmar Oil Co.'s O'Harrow 1, ur 2640 ft. Phillips Pet. Co.'s J. A. Whitten 1, elev 2333 ft, co 5954 ft. Munger-Wilson Oil Co.'s Page 1, elev 2270 ft, ur 2270 ft.

SCURRY COUNTY—J. G. Armand & Camp Spring O&R Co.'s Quinn 1-A, elev 2316 ft, ur 3900 ft. Pender O&G Co.'s Davis 1, set cas with show oil and gas 4320-30 ft. E. L. Smith & Magnolia's Mooar 1, elev 2519 ft, top salt 750 ft, sd 4050 ft. Transcontinental & Vacuum Oil Co.'s Peckham 1, elev 2155 ft, set cas 460 ft.

TAYLOR COUNTY—Condor Pet. Co.'s K. Stocker 1, fsh 1077 ft. A. H. Gibson et al's M. E. Cody 1, sp and sd. Gibson & Johnson's Bingham 1, rig. J. B. Jameson et al's Webb 1, elev 1905 ft, dr 5395 ft.

TERRELL COUNTY—Big Bend Oil Corp.'s Bassett 1, elev 2396 ft, co 1285 ft. Transcontinental Oil Co.'s Goode 1, elev 2405 ft, dr 2440 ft. Keck-Pecos Oil Trust's Hamilton 1, sd 3150 ft.

UPTON COUNTY—TP Coal & Oil Co.'s E. V. Belcher 1, top salt 1310 ft, dr 2195 ft.

VAL VERDE COUNTY—Phantom Oil Co.'s Ingram 1, set cas 2551 ft.

WARD COUNTY—Alpine Oil & Dev. Co.'s Dakan 1, sd 2210 ft. Anderson et al's Townsite 1, sd 2183 ft. C. C. Dorr & Atlantic's Costley-Dorr 1-A, elev 2493 ft, dr 2225 ft. Gulf Prod. Co.'s Hutchings 3, elev 2659 ft, top salt 1035 ft, flowing 187 bbls oil, dr 3050 ft; Hutchings 4, rig; O'Brien 7, elev 2653 ft, top lime 2460 ft, swedge cas after shot, pb from 3566 to 3025 ft; O'Brien 8, rig. Harrison Oil Co. & FHE Oil Co.'s Wristen 1, elev 2530 ft, top salt 715 ft, sd 3325 ft. Penn Oil Co. & Atlantic's Bennett 2, elev 2579 ft, top salt 2085 ft, top lime 2260 ft, pb from 2630 ft to 2625 ft and swabbing 15 bbls oil daily. Sid Richardson-Kelsey & Magnolia's O'Brien 1, sd 425 ft. Shell Pet. Corp.'s Sloan-Owen 1, top salt 765 ft, making oil and water, dr 4175 ft. Shipley Oil Corp.'s Hayzlett 4, dr 2605 ft. J. E. Smith et al's Clements 1, dr 315 ft. Sturm & Paine's Cummins 1, elev 2443 ft, top salt 780 ft, sd 2350 ft. Southern Crude Oil Pur. Co.'s Hill & Hill 1, elev 2613 ft, top salt 2223 ft, dr anhydrite 2300 ft. Sun Oil Co.'s Sealy 1, elev 2680 ft, lowering 6⅝-in cas hfw 2365 ft. Tex-Oil Production Co.'s Redman 1-A, elev 2717 ft, top salt 1290 to 4133 ft, sd 4395 ft.

WINKLER COUNTY—Sun Oil Co.'s Sealy 2, elev 2317 ft, dr anhydrite 3080 ft.

## CENTRAL EAST TEXAS

ANDERSON COUNTY—Humble's W. Johnson 1, Jas. Hall sur, dr 1610 ft. Magnolia's Ed F. Williams 2, Wm. Bledsoe sur, top Pecan Gap chalk 3880 ft, dr 3910 ft. W. H. Roeser, Inc. & Roeser-Pendelton Inc.'s W. L. Moody 1, Jas. Welch sur, elev 349 ft, top Pecan Gap chalk 2953 ft, dr lime 4415 ft. Sun oil Co.'s Bowers-Maier 1, E. G. Meyers sur, dr 940 ft.

DELTA COUNTY — Geo. Kean & J. B. Evans' Smith 1, J. B. Anderson sur, elev 506 ft, dr 1560 ft.

ELLIS COUNTY—G. C. Foster & S. C. Richardson's Moise-Cerf 1, La Pena sur, top Austin chalk 531 ft, dr chalk 850 ft.

FREESTONE COUNTY—Haley & Young's G. W. Pierce 1, lcn. O. W. Killam-Phillips et al's R. H. Edwards 1, A. Sanchez sur, rotary rig. C. F. Lytle et al's Holt 1, D. Avany

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sur, top chalk 3906 ft, dr 4270 ft. Penn Oil Co.-Dixie Oil Co. & J. R. Black's B. M. Burgher 1, C. Chamar sur, rig.

HENDERSON COUNTY—H. B. Ashburn et al's T. E. Berry 1, Arron York sur, rig. E. L. Chapman et al's Cade 1, Simon Weiss sur, dr 2050 ft. Cranfill-Reynolds Co. & La. Oil Ref. Corp.'s J. W. Broome 1, Samuel Chears sur, top Midway 1216 ft, dr 2215 ft. Shell Pet. Corp.'s Stevens 1, A. D. Owens sur, rotary dk.

HUNT COUNTY—Dilworth Hager et al's J. C. George 1, E. Tidwell sur, materials.

LAMAR COUNTY—B. L. Laubenheim et al's S. D. Johnson 1, Wm. Driggers sur, elev 667 ft, top chalk 1310 ft, fsh stem 3090 ft.

LIMESTONE COUNTY — Haley & Heemann's D. Wilkes 1, John Breeding sur, sd 690 ft.

RUSK COUNTY — E. M. Joiner et al's Bradford 3, dr 2380 ft. Magnolia Pet. Co.'s Duran-Wylie 1, Aquilla Norris sur, elev 431 ft, dr chalk and shale 2140 ft.

SMITH COUNTY—Deep Rock Oil Co. et al's Bowdoin-Fleming 1, M. V. Lout sur, elev 434 ft, dr 3360 ft. East Texas Pet. Corp.'s People Bank 1, John McFadden sur, elev 465 ft, dr 2610 ft. Owen-Sloan Co. & R. H. Davis' J. H. Starnes 1, J. W. Allen sur, dr 1275 ft. O. M. Rector et al's M. Dozier 1, Mathew Maise sur, lcn. A. M. Sutton et al's J. M. Hammond 1, Jas. Reed sur, dr 680 ft.

TITUS COUNTY — Wainwright-West Oils Ltd. (W. L. Murrell & Geo. M. Anderson's) Walcott & Lott 1, D. M. Smith sur, sp.

VAN ZANDT COUNTY—Warren Daniels et al's Fannie Cumby 1, John Wright sur, dk. Dennis Oil Co. (H. Harper et al's) C. W. Morris 1, C. L. Morrison sur, sd 1130 ft. Manley-Sprinkle & Evans' B. C. Andrews 1, Margaret Neal sur, rotary rig. Pandem Oil Corp. et al's R. L. Brin & W. W. Gibbard 1, Ray Sunigas sur, materials. Arthur H. Ray & Ward Powell's A. J. Berry 1, Nacogdoches County sur, sd 1750 ft. Texas Chief Oil & Royalty Co.'s J. P. Foster 1, F. Montgomery sur, sp and sd. Van Zandt Oil & Dev. Co.'s Sharp-Robinson 1, J. B. Ybarbo sur, chalk 1829-1835 ft, dr 2260 ft.

VAN ZANDT COUNTY (Van Field)—Central Oil Co.'s R. H. Peters 1, dk. Cranfill-Reynolds Co.'s C. S. Coker-Ledbetter 1, rotary rig. Hart Oil Co.'s O. L. Swain 1, lcn. Humble O&R Co.'s W. Freeman 1, rig. Pure Oil Co.'s R. C. Crim 1, elev 483 ft, cemt cas 2880 ft, td 3037 ft; A. D. Clark 1, sd to cemt cas 2755 ft; Ellison 1, rig; Davis 1, lcn abn; D. R. Howell 1, cemt cas 2609 ft; Jarman 2, dr 1500 ft; Thompson 2, dr 2250 ft; A. R. Tunnell 1, dr 2420 ft; R. L. Wells 1, rig. Pure Oil Co. & Hill & Hill's R. H. Peters 1, dk. Shell Pet. Corp.'s B. M. Fowler 1, dr 1230 ft; Tunnell 3, dr 2480 ft. The Texas Co.'s R. A. Tunnell 1, dr 2260 ft; R. V. White 1, cemt cas 2791 ft.

WOOD COUNTY—Big Indian Oil & Dev. Co. & Tidal Oil Co.'s R. J. King 1, W. M. Barnhill sur, materials. Gulf Prod. Co.'s N. E. Carver 1, Wm. Kern sur, top Pecan Gap chalk 2870 ft, dr 3350 ft. Westexas Oil & Royalty Corp.'s Negro Orphanage 1, Chas. E. Rivers sur, dr 1225 ft.

## TEXAS GULF COAST

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| WASHINGTON COUNTY— | | |
| Penn-Tex Oil Co., Kamas 1..... | * | 1520 |
| Kelsey et al, Seidel 1, w Brenham.. | * | 3017 |
| JEFFERSON COUNTY— | | |
| Stillwell Oil Co., Brinkman 1, near Pt. Arthur ..... | * | 3600 |

AUSTIN COUNTY—J. T. O'Hara et al's Batla 1, 2 mi nw Raccoon City, fsh at 3550 ft. Black Oil Co.'s Lancashire 1, 3 mi s Sealey, dr 2450 ft, gbo. McInnerrey & Harris' McDade 1, Jno. Martin sur, sd 500 ft. Empire's J. T. Boyd 1, San Felipe, lcn.

BRAZORIA COUNTY—Thos. Faust et al's Fee 6, 2 mi s Nash Dome, dr 3820 ft gbo. Shell's Blakely-Winston 1, 2 mi ne Danbury, cared salt water sand at 4575 ft. Rycade's Wisdom 26, Nash dome, dr 5850 ft. Ruck's & Patterson's Hunter 1, sw Hoskins Mound, sd 1050 ft. Ward Drlg. Co.'s Proctor 1, w Hoskins Mound, dr 2410 ft gbo. The Texas Co.'s O. F. Ewing 1, Manvel area, ru.

CHAMBERS COUNTY — Pure's W. F. Mayes 10, Lost Lake, dr 950 ft gbo; Lost Lake 4, dr 3150 ft gbo. Shell's Herff 1, Moss Bluff, ru. Patton et al's H. Jackson 1, 4 mi w High Island, dk.

FORT BEND COUNTY — Gulf's Brazos Valley Irrig. Co. 1, 3 mi sw Cloidne, dr 4920 ft shale; Moore 20, Moores Field, completed for 2200 bbls pipe line oil at 3920 ft. Pure's Jackson Brown 1, 5 mi e Long Point, dk.

HARRIS COUNTY—Humble's Simms-Smith 77, Goose Creek, dr 5400 ft rock; Warren 7, Hockley, dr 4430 ft shale; Woodburn 2, 2 mi s Genoa, abn at 5241 ft sand; Minnetex 2, Mykawa, stdg 1177 ft; Siadous 1, Mykawa, swabbed some oil with salt water at 4906 ft, pulling screen to dr deeper. Watts Drlg. Co.'s Hubert 1, Mykawa, cor sand 5100 ft. Higgins Oil & Fuel Co.'s Siadous 1, Mykawa, dr 5650 ft sand. Mrs. J. C. Baldwin's Kitzman 1, 2 mi n Cypress, cor sandy shale at 4170 ft. Martin-Drake & Jones' Haney 1, 3 mi e Elena, dr 2900 ft gbo and lime. Buffalo Oil Co.'s Beall 1, 2 mi nw Eureka, abn at 4662 ft in gumbo and lime. Sloan Prospecting Co.'s Mrs. J. Ulrich 1, 5 mi nw Barbers Hill, lcn.

JEFFERSON COUNTY — Gulf's Bordages 8, Fannett, dr 6000 ft sandy shale; Burrell 5, ru; G. W. Junker 1-A, dr 5675 ft shale; E. Thomas 13, dr 3760 ft gbo. The Texas Co.-Houston Oil Co.'s Fitzhugh 1, Big Hill, washing at 5853 ft. The Texas Co.'s Pipkin 2, Big Hill, fsh 6010 ft. Stillwell Oil Co.'s Brinkman 1, Port Arthur, abn at 3600 ft. Bayou Oil Co.'s Hooks-Bordages 1, 2 mi s Voth, ru.

LIBERTY COUNTY—Harrison Oil Co.'s Jamison 1 ,N. Dayton, dr 4725 ft sticky shale. The Texas Co.'s Fee 1, N. Dayton, dr 1125 ft. Houtex Oil Co.'s Brown & Tadlock 1, N. Dayton, dr 2500 ft gbo. Gulf's Weiser 1, Hankamer, dr 6125 ft shale; Boyt 3, Hankamer, dr 4710 ft sand. Cranfill-Reynolds' Esperson 7-A, Esperson Dome, came in flowing 700 bbls daily at 2296 ft; Esperson 8-A, dr 1400 ft; Moores Bluff Corp. 2, Esperson dome, dk; Davis 2, Esperson dome, came in flowing 350 bbls clean oil daily at 2304-20 ft. Yount-Lee Oil Co.'s Moores Bluff Corp. 2, Esperson Dome, dr 2500 ft in sdtr hole, td old hole 6675 ft.

MATAGORDA COUNTY—Cockburn et al's Hawkins 1, Shepherds Mott, dr 4285 ft in gbo and lime.

MONTGOMERY COUNTY — Kelly-Baker's Juergus 2, 3 mi Conroe, dr 800 ft.

ORANGE COUNTY — Veteran Oil Co.'s Read 1, 2 mi se Orange field, sd 4600 ft. Gulf's H. J. Stark 1, Port Neches, abn at 6609 ft in sand. The Texas Co.'s Kuhn 2, Port Neches, lcn; Stark 2, Port Neches,dk.

VICTORIA COUNTY — Humble's Welder 1, 3 mi se Nursery, dr 5924 ft shale.

WALKER COUNTY — Indian Pet. Co.'s Smither 1, ne Huntsville, dr 2000 ft. Geo. Hindman et al's Delta Ld. & Lbr. Co. 1, 4 mi w New Weaverly, dr 1250 ft.

WALLER COUNTY—Kirby Pet. Co.'s Jim Davis 1, San Felipe, abn at 2941 ft, well blew out and cratered. Morris & Veihl's Chapman 1, dr 2035 ft shale.

WASHINGTON COUNTY — Anderson et al's Hughes 1, 3 mi n Chappel Hill, dr 2941 ft shale; Muellar 1, ne Burton, dk. L. O. Gleason's Nowak 1, near Brenham, dr 1525 ft shale. Sun's Clay 3, Clay Creek, dr 1400 ft shale; Draeger 1, dr 650 ft shale. W. B. Birdwell's Schram 1, 3 mi e Brenham, dr 1200 ft shale.

WHARTON COUNTY—Houston Gulf Gas Co.'s Fields 1, Boling, abn 4305 ft.

## SOUTH LOUISIANA

ACADIA PARISH — Yount-Lee Oil Co.'s Houssiere-Latrielle 8, Evangeline, dr 5825 ft hard sand; C. O. & M. Co. 6, dr 3660 ft gbo. Chas. P. Seiss' Abshire 1, 1 mi w Crowley, dr 4775 ft shale. The Texas Co.'s Rayne Heirs 5, Evangeline, dr 7080 ft sticky shale. Cline, Smith & Cline's Conklin 10, Evangeline, dr 2375 ft gbo. Calcasieu Oil Co., Magnolia & Union Sulphur Co.'s Hayes 1, dr 1325 ft.

ASCENSION PARISH—Gulf's United Lds. Co. 17, Sorrento, dr 4020 ft shale. McElroy Oil Corp.'s J. D. Lacey et al 2, depth 4070 ft.

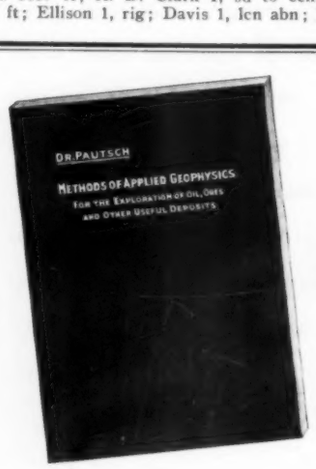
ASSUMPTION PARISH—Gulf's Armalise Planting Co. 1, Napoleonville, dr 5660 ft shale.

CALCASIEU PARISH—J. O. Davis' Industrial Lbr. Co. 1, Starks, stdg at 3770 ft. Texas Gulf Sulphur Co.'s Lutcher-Moore 11, Starks, abn 1700 ft cap rock; Lutcher-Moore 12, Starks, abn 1750 ft cap rock; Nos. 13 and 14, lcns; Industrial Lbr. Co. 2, lcn.

CAMERON PARISH—The Texas Co.'s Calcasieu Lake 5-A, piling ready; State E. Hackberry 6, dr 3300 ft gbo. Pure's Yount-Lee 8, Sweet Lake, set cas at 5600 ft, waiting on cement to set; Yount-Lee 9, dr 4125 ft sand. Shell's Watkins 14, Black Bayou, driving piling. Vacuum Oil Co.'s Cameron Meadows 1, e Johnson Bayou, dr 1404 ft water sand. Calcasieu Oil Co.'s Caldwell 5, E. Hackberry, dr 4700 ft sand; Verdine 1, E. Hackberry, dr 3950 ft sandy shale. Sunshine Oil Corp.'s Ellender 6, Hackberry, dr 2450 ft gbo. Rycade-Humble's Gulf Ld. 5, Hackberry, dk; 1, wo, dr 4600 ft shale.

EVANGELINE PARISH — Evangeline Oil Co.'s Guillery 1, Pine Prairie, abn 3000 ft.

IBERIA PARISH—The Texas Co.'s Ver-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milion Bay A-4, abn 6125 ft salt; 5, lcn. Jefferson Lake Oil Co.'s Lake Peigneur 5, Jefferson Island, driving piling; 6, lcn.

IBERVILLE PARISH—Shell's Wilbert 4, White Castle, set cas at 2025 ft. Standard's Schwing 3, Bayou Blue, prep to pump; 2, fsh; 4, set surface cas; 5, capped piling; Wilbert 5' Bayou Blue, set surface cas; 6, capped piling; Case 1, Bayou des Glaise, dr 1250 ft.

JEFFERSON DAVIS PARISH—Pure's Day 1, 1½ mi sw Welsh, fsh 3975 ft.

LA FOURCHE PARISH — Gulf's City of New Orleans 1, Sec. 19-23s-23e, dr 5175 ft shale.

PLAQUEMINES PARISH—The Texas Co.'s Garden Island Bay 4, bldg dk foundation. Humble's Cockrell-Moran 1, T 20s, R 26e, dr 1740 ft; Lake Washington 1, 20s-26e, sdtr 4250 ft.

ST. LANDRY PARISH — Elbof Explorations' Valmont Ledoux 1, Eunice, sd 4360 ft. The Texas Co.'s Botany Bay Fee 5, Port Barre, dr 1100 ft gbo; 6, dr 3100 ft gbo. Gulf's Godet 3, Port Barre, dr 200 ft; Hoskins 2-A, Port Barre, ru. Hebert-Baker Oil Co.'s Fisher 1, Sec. 10-3s-4e, dr 3810 ft hard sand.

ST. MARTIN PARISH—The Texas Co.'s St. Martin Ld. Co. Fee 1, Hager dome, dr 6475 ft sand; 2, dr 5275 ft sticky shale; Iberville Ld. Co. Fee 1, Hager dome, dr 5900 ft hard shale. Yount-Lee Oil Co.'s Hebert Heirs 1, Anse la Butte, dr 5200 ft hard sand; 2, lcn. Rycade-Humble's Bayou Bouillon 9, dr 3125 ft; Atchafalaya Fee 5, Bayou Bouillon, dr 4300 ft sand.

ST. MARY PARISH — La. Ld. & Explo. Co.'s Clarke 2, Glenwild, dr 5600 ft sandy shale. Empire-Vacuum's Oscar Zenor 1, 2 mi n Patterson, dr 4318 ft gbo. Pure's Wax Lake State 1, moving in; 2, lcn.

TERREBONNE PARISH—The Texas Co.'s Caillou Island 2, wo, milling; 3, lcn; Four Isle 3, dk; Lake Pelto B-2, dk; Lake Pelto B-3, set cas at 4300 ft; Bay St. Elaine 4, ru; Lake Barre State 3, set cas at 3870 ft to test; Dog Lake B-2, abn at 6350 ft in water sand; Dog Lake 2-A, lcn.

## OKLAHOMA

WOODS COUNTY—T 28n, R 16w, Sec. 23, Peerless' Cromwell 1, cnw ne, dr 4440 ft.

GRANT COUNTY—T 28n, R 7w, Sec. 27, Gypsy, Bilderback 1, se c dr 5785 ft. T 28n, R 4w, Sec. 12, Boucher et al, Dedman 1, sw c se, hfw 3105-30 ft, 4735 ft dr by casing.

WOODS COUNTY—T 27n, R 16w, Sec. 33, Sinclair, Share 1, c ne sw, co 6745 ft.

ALFALFA COUNTY—T 27n, R 11w, Sec. 12, Smith Bros, Forbes 1, nec se nw nw, sd 1420 ft.

HARPER COUNTY—T 26n, R 24w, Sec. 14, Sinclair, Howell 1, c sw sw, show oil 6711-16 ft, dr 7502 ft.

GRANT COUNTY—T 26n, R 3w, Sec. 23, Otstot Dev. Co., Tapor 1, nec se, hfw 3100-25 ft, 6-inch at 3935 ft.

KAY COUNTY—T 26n, R 2e, Sec. 32, J. A. Vincent & Natl Union, McNeal 1, nwc ne, sd 2795 ft.

WOODS COUNTY—T 25n, R 15w, Sec. 10, Bu Vi Bar et al, Fee 1, sec sw, 6104 ft sd.

GRANT COUNTY—T 25n, R 4w, Sec. 22, Cowden, Volmer 2, nec se ne sw, lost tools, sd 5640 ft.

ALFALFA COUNTY—T 24n, R 11w, Sec. 14, J. V. Bailey et al, Acre 1, c sw ne, water 4649 ft, 4660 ft, 8-inch at 4660 ft.

GARFIELD COUNTY—T 24n, R 6w, Sec. 9, Pulse & Beamer, White 1, sec nw, hfw 4730-4800 ft, sd 5556 ft.

WOODWARD COUNTY—T 23n, R 20w, Sec. 9, Harris & Haun, Wyatt 1, c se, hfw 5616-60 ft, dry and abn.

GARFIELD COUNTY—T 23n, R 4w, Sec. 32, Shell et al, Loomis 1, c nw nw, dr 2959 ft.

NOBLE COUNTY—T 22n, R 1w, Sec. 28, Gypsy et al, Berstrem 1, sec nw, dr 800 ft.

WOODWARD COUNTY—T 31n, R 21w, Sec. 25, Sharon, Elmore 1, swc, sd 3025 ft, rig blown down. T 21n, R 19w, Sec. 19, Burgoyne Bros., Merklin 1, swc se ne, sd 1910 ft.

MAJOR COUNTY—T 20n, R 14w, Sec. 23, Keller et al, Horton 1, c ne ne, spudded and sd.

GARFIELD COUNTY—T 20n, R 4w, Sec. 10, Coneinental et al, Brown 1, cel ne nw sw, show gas 3145-62 ft, dr 5240 ft, 15M gas.

BLAINE COUNTY—T 19n, R 10w, Sec. 13, Washoma. Phillips 1, c nw sw, sd 2945 ft.

LOGAN COUNTY—T 18n, R 3w, Sec. 33, Healy et al, Quier 1, sec sw, sd 3970 ft. T 17n, R 4w, Sec. 34, Currie et al, Katcher 1, swc ne sw, cellar.

KINGFISHER COUNTY—T 16n, R 7w, Sec. 6, Gault-Brown, Boch 1, c nw se, (owdd), sd 6022 ft.

OSAGE COUNTY—T 29n, R 6e, Sec. 29, Duffield & Howard et al, 1, nec nw, dr 1380 ft. T 24n, R 5e, Sec. 24, Coneinental Oil Co. 1, nwc se se, dr 1870 ft.

PAWNEE COUNTY—T 23n, R 5e, Sec. 15, Cochran et al, McFadden 1, nec sw, rig. T 21n, R 7e, Sec. 32, Turner et al, Niccum 1, sec ne se, dr 900 ft.

PAYNE COUNTY—T 18n, R 4e, Sec. 6, F. M. Marrs et al, Tietz 1, swc nw se, lcn T 17n, R 1e, Sec. 4, Wheeler & Mote, Funnell 1, nec se, dr 1305 ft.

LINCOLN COUNTY—T 17n, R 5e, Sec. 16, Jilson & Kemp, School Land 1, sec sw, ur 10-inch 1688 ft.

OKFUSKEE COUNTY—T 13n, R 9e, Sec. 15, Erwin and others, W. Allen 1, sec sw ne, dr 1090 ft. T 12n, R 9e, Sec. 36, Henry Oil Co., Harjo 1, nwc, sd 2785 ft. T 12n, R 10e, Sec. 3, Sheperd et al, Shepperd 1, sec nw sw, 3660 ft sd. T 10n, R 10e, Sec. 25, Transcontinental et al, Lasley 1, swc nw, dr 1420 ft.

MUSKOGEE COUNTY—T 11n, R 19e, Sec. 21, E. Mills et al, Martin 1, nwc se, sd 1001 ft.

McINTOSH COUNTY—T 10n, R 14e, Sec. 31, Jennings Bros., Crabtree -, sec nw sw, dr 4300 ft.

PITTSBURG COUNTY — T 9n, R 16e, Sec. 32, Pattison et al, McDuff 1, swc nw se, Wx 5443-5511 ft, show oil 5446-70 ft, 1M gas 5464-80 ft, sand 5556-60 ft, fsh

HASKELL COUNTY—T 9n, R 18e, Sec. 10, Marion Oil Co., Sanders 1, nwc ne sw, sd 2692 ft.

LATIMER COUNTY—T 7n, R 22e, Sec. 36, J. S. Cochran et al, Cushing 1, nwc se se, sd 2100 ft. T 6n, R 22e, Sec. 23, Limestone O&G Co., Shaw 1, nwc ne nw, 6-inch at 1820 ft.

OKLAHOMA COUNTY—T 13n, R 1w, Sec. 13, Tom Slick, Martin 1, c nw nw, td 6964 ft, water, pb, woc. T 13n, R 3w, Sec. 35, Magnolia et al, Johnson 1, ne ne sw, dr 4786 ft. T 11n, R 2w, Sec. 3, Ryan Consolidated, Lawton 1, ne nw, fsh 4715 ft.

POTTAWATOMIE COUNTY—T 6n, R 3e, Sec. 22, Payne Drlg. Co., Bullock 1, sec ne, td 4150 ft, 3800 ft water, fsh. T 6n, R 3e, Sec. 36, Sykes et al, Cook 1, sw nw ne, rig.

CLEVELAND COUNTY—T 6n, R 1e, Sec. 20, Brownfield, Corbett 1, c sw ne, dr 3710 ft.

HUGHES COUNTY—T 9n, R 12e, Sec. 29, Canady, Canard 1, swc nw nw, 1M gas 2815 ft, sd.

POTTAWATOMIE COUNTY—T 8n, R 4e, Sec. 30, Keister & Manning, Towlett 1, swc se ne, Hunton lime 4465-81 ft flow 245 bbls.

SEMINOLE COUNTY—T 6n, R 6e, Sec. 6, Mid-Continent, Talahoke 1, sec nw, 8-inch at 3223 ft. Sec. 19, Superior, Morgan 1, sec, dr 2360 ft. T 6n, R 8e, Sec. 31, Magnolia, Reed 1, nec se nw, sand 2655-2684 ft, swab 120 bbls.

ROGER MILLS COUNTY—T 12n, R 24w, Sec. 23, Bucy & Stone, Williams 1, c sw, dr 1150 ft. T 11n, R 26w, Sec. 4, L. C. Hivick Davis 1, c nw ne, 2840 ft cemtg cave.

CANADIAN COUNTY—T 10n, R 6w, Sec. 1, J. V. Bailey, Robinson 1, c ne nw, sd 150 ft.

BECKHAM COUNTY—T 8n, R 22w, Sec. 20, Carson et al, Denby 1, swc se ne, sd 1700 ft.

GREER COUNTY—T 6n, R 24w, Sec. 17, I. T. I. O. et al, Fee 1, c ne, dr 2100 ft. Sec. 23, Helmerich & Payne, 1, c nw nw, sd 2240 ft.

CADDO COUNTY—T 6n, R 13w, Sec. 8, Abernathy et al, Horton 1, sec, 8-inch at 596 ft.

COMANCHE COUNTY—T 3n, R 9w, Sec. 3, Okla. Nat. Gas Co., Doebel 1, nec sw sw sw, dr 500 ft.

STEPHENS COUNTY—T 2n, R 8w, Sec. 30, Smythe & Nash, Johnson 1, nec, sand 2480-83 ft, est. 10 bbls.

COTTON COUNTY—T 2s, R 9w, Sec. 8, Thomas Medlin, Johns 1, swc se, dr 2100 ft.

STEPHENS COUNTY—T 3s, R 9w, Sec. 22, Pelwin et al, King 1, swc se (owdd), sd 3180 ft.

JEFFERSON COUNTY—T 5s, R 7w, Sec. 11, H. W. Lee, Hotubbi 1, sec nw, (owdd), sd 2513 ft.

HUGHES COUNTY—T 5n, R 10e, Sec. 30, Erwin et al, Jones 1, sec ne, rig. T 5n, R 11e, Sec. 15, J. J. Wright, Roberts 1, sec sw, rig.

GARVIN COUNTY—T 4n, R 1e, Sec. 11, W. H. Peckham et al, Mullins 1, c w2 w2, sd 3290 ft. T 4n, R 3e, Sec. 10, C. R. Obermyer, Stricklin 1, nec sw, dr 320 ft.

ATOKA COUNTY—T 3s, R 10e, Sec. 18, Brookshire et al, Guinn 1, nwc nw, sd 80 ft.

CARTER COUNTY—T 4s, R 2e, Sec. 32, Tex-Okla. Drlg. Co., Anderson 1, sec ne se, 1980 ft dr by tools.

MARSHALL COUNTY—T 5s, R 5e, Sec. 17, Jordan et al, Penn Mutual Life Ins. Co. 1, nwc ne se, sd 700 ft.

BRYAN COUNTY—T 9s, R 9e, Sec. 36, W. C. Endicott et al, Craig 1, c nw ne, dr 2157 ft.

WOODWARD COUNTY—T 23n, R 17w, Sec. 23, The Prairie O&G Co. et al, Wilbur 1, nec, dr 6170 ft.

CLEVELAND COUNTY—T 10n, R 2w, Sec 8, Prairie, Slick & Phillips, Sudik 1, c ne ne, 7720 ft plugging.

## NORTH LOUISIANA

| Company, Well and Location | | Initial Production Bbls. | Depth |
|---|---|---|---|
| BOSSIER PARISH— | | | |
| Natural Gas Prod. Co., U. S. 1, 31-23-11 | | 10 | 3174 |
| DE SOTO PARISH— | | | |
| Benedum & Trees Oil Co., Johnson 1, 7-11-13 | | ¶12 | 2865 |
| RICHLAND PARISH— | | | |
| Palmer Corp., Miles 2, 13-17-6e | | * | 2315 |
| SABINE PARISH— | | | |
| Haynes Bros., Meyer 1, 28-8-12 | sw | | 2800 |
| Ruston Drilling Co., Holliday 1, 35-8-12 | sw | | 2728 |
| Warner Quinlan Co., Sabine Lbr. Co. 1, 34-8-12 | sw | | 2730 |

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BOSSIER PARISH—Lide et al's Matlock 1, rig up. Natural Gas Prod. Co.'s U. S. 1, 31-23-11, pumping 10 bbls day, td 3174 ft. U. S. 2, 31-23-11, dr 2550 ft. U. S. 3, 31-23-11, lcn. U. S. 4, 31-23-11, lcn. Bahan & Bahan et al's Pleasant 1, 25-23-12, dk; Mays 1, 26-23-12, set 6-inch cas 2960 ft, td 2970 ft, ready drill in. Delaware La. Dev. Co.'s Bolinger 3, 38-23-11, old well arr deepen. Greenwood Prod. Co.'s et al's Farrington 1, 23-23-12, rig up. H. L. Hunt et al's Allen 1, 30-23-11, dr 500 ft; J. W. Peyton 4, 25-23-12, dr 1900 ft; J. W. Peyton 5, 25-23-12, dr 1600 ft; J. W. Peyton 6, 25-23-12, rig up; J. W. Peyton 7, 25-23-12, lcn; J. W. Peyton 8, 25-23-12, rig up; J. W. Peyton 9, 25-23-12, lcn; J. W. Peyton 10, 25-23-12, rig up. Woodley et al's Robertson 1, 22-23-12, rig up; L. & A. 2, 14-23-12, old well, rig up to deepen, td 3081 ft. C. L. West et al's Sentell-Dickson 1, 3-20-13, arr ds test 1900 ft. Lanier et al's Le Rosen 1, 26-21-14, dk pat. Nell & Lenier's Biedenharn 1, 23-21-14, wosr 998 ft. Walker et al's Antrim 1, 28-21-13, sd 3184 ft. Jacob Laskin, Tr.'s Pardee 2, 3-22-11, wosr, td 2655 ft. H. S. Autrey's Smith 1, 26-19-11, plugged back from 1836 ft, set 4½-inch cas 1246 ft, bailing to test 1501 ft. Muslow Oil Co.'s Barnett 1, 25-23-12, dr 2350 ft. Marks' Meyer 1, 36-23-12, old well, arr deepen, td 3088 ft; Kilgore C-1, 31-23-11, set 4½-in cas 3150 ft 2500 ft oil hole wosr, td 3167 ft; Peyton 2, 30-23-11, rig up; Peyton 3, 30-23-11, dr 2670 ft; Kilgore B-2, 31-23-11, dr 1300 ft; Kilgore B-3, 31-23-11, dr 1170 ft; Floyd 1, 25-23-12, sp dr 230 ft; Kilgore A-2, 31-23-11, dk. Goodman-Johnson's Martin 1, 30-23-11, wosr 3169 ft. Ark. Fuel Oil Co.'s Bolinger 1 (formerly carried Bolinger 5), 38-23-11, set 6⅝-inch cas 3167 ft, td 3170 ft. Magnolia Pet. Co.'s Matlock 2, 25-23-12, lcn; Matlock 3, 25-23-12, lcn; Dodson 1, 16-23-12, old well arr deepen 3085 ft. Roberson 1, 26-23-12, old well arr deepen, td 3058 ft. La. Pet. Co.'s H. H. Bain 1, 31-23-11, rig up. H. H. Bain 2, 31-23-11, rig up. Palmer Corp.'s Robinson 1, 26-23-12, wosr 3175 ft. Texas Co.'s J. W. Peyton 2, 25-23-12, dr 2602 ft. Peyton 4, 30-23-11, rig up. Wilkinson 3, 31-23-11, rig up. Wilkinson 4, 31-23-11, rig up. Tippett et al's Holmes 1, 36-23-12, rig up. Lee Kennebrew et al's Garrett 1, 36-23-12, dr 1500 ft. Delaware La. Dev. Co.'s Bolinger 6, 38-23-11, rig up. Olsan Bros. et al's Pine Woods Lbr. Co. 1, 25-23-12, lcn. Phillips Pet. Co.'s Floyd 1, 25-

23-12, rig up. Bolinger 3, 30-23-11, sp, dr 50 ft. Bolinger 4, 30-23-11, dk. E. W. Bateman's Bolinger 1, 38-23-11, lcn. Bolinger 2, 38-23-11, lcn.

CADDO PARISH—Triangle Drilling Co.'s Hardy 1, 18-19-16, dr 1600 ft. C. W. Robinson's Wilson 1, 2-15-16, dr 650 ft. Sam Gold et al's Hunter 3, 17-19-14, wosr 2457 ft. I. N. Pharris' Oden 1, 19-19-14, set 6⅝-in cas 2379 ft, td 2409 ft. Old River Oil Corp.'s Sibley 1, 15-19-14, wosr 2495 ft. Dixie Oil Co.'s Dickson 1, 10-19-14, lcn abn, will not drill. R. W. Norton's Hill 1, 33-23-16, sd, wo 4496 ft. Magnolia Pet. Co.'s Swann & Davis 1, 16-21-14, rig up. L. B. Mawk's Swann Bros. 1, 23-21-14, rig up.

CLAIBORNE PARISH—El Dorado Chief Oil Co.'s Simmons 1, 27-20-7w, sd in shale and bldrs 2240 ft. Triangle Drilling Co.'s Kilpatrick 1, 7-19-5w, set 9-in cas 4266 ft, making 1½ mil ft gas, spray oil, trace sw 4558 ft, 10 ft sand.

CONCORDIA PARISH—Joe Marr et al's Maxwell 1, 35-3-8e, sd, high water, td 400 ft.

DE SOTO PARISH—Benson O&G Co.'s Harris 1, 6-10-13, set 6⅝-in cas 3070 ft, tested dry, show gas, sd, wo, td 3650 ft. R. O. Roy's Farmer E-1, 5-13-13, set 6⅝-in cas 2765 ft, dr plug. Farmer B-1, 8-13-13, dk. Benedum & Trees' Johnson 1, 7-11-13, base chalk 1835 ft, making 12,859,000 cu ft gas, slight spray sw, 960 lbs r.p. td 2865 ft.

FRANKLIN PARISH—Evansville Inv. Co.'s Welch 1, 2-14-8e, sd 3030 ft. Franklin O&G Co.'s O'Brien 1, 7-15-9e, dr 1600 ft. Davis et al's Moore 1, 12-11-6e, sd 1430 ft.

NATCHITOCHES PARISH—S. D. McDaniels' Clark-Morse 1, 23-5-6w, sd 2436 ft. Robeline O&G Co.'s Winn 1, 7-8-9w, dr rock 1635 ft. Nichols & Wilder's Clark 1, 10-10-8w, topped Blossom 2804 ft, cored sw sand to 2820 ft, arr abn as sw hole, td 2820 ft.

OUACHITA PARISH—J. L. Bullock, Tr.'s West Va. 1, 25-18-5e, sd 2700 ft.

RAPIDES PARISH—Ayers Bros.' Wicklipp 1, 9-5n-2w, sd 2650 ft.

RED RIVER PARISH — W. D. Ball's Krumbholz 1, 32-14-10, sd high water 1560 ft.

RICHLAND PARISH—Richland O&G Co.'s Singletary 1, 20-18-7e, set 9-in cas 970 ft. Austin & McDonald's Millsaps 2, 17-17-6e, sd 2697 ft. Millsaps 3, 16-17-6e, sd 2477 ft. Millsaps 4, 16-17-6e, lcn. Millsaps 5, 8-17-6e, dk. Hunt 1, 13-17-5e, dk. Industrial Gas Co.'s Hodge 1, 7-16-7e, fsh ds 2874 ft. A. T. Davidson 1, 6-16-7e, sd, wo 2762 ft. Ruston Drlg. Co.'s Hodge 1, 7-16-7e, sd, wo 2600 ft. Palmer Corp.'s Miles 2, 12-17-6e, set 6-in cas 2316 ft, rig moved and abn in litigation. W. C. Feazel's Landrum 1, 6-16-7e, dk. Shreveport Contractors' Buie 1, 17-15-7e, sd in black shale 2627 ft. International Gas Prod. Co.'s La Grone 1, 7-16-7e, lcn.

SABINE PARISH—Sabine O&G Co.'s Anderson 1, 19-8-12, sd, wo 2603 ft. Benedum & Trees' Bowman-Hicks A-2, 3-7-12, set 8¼-in cas 2390 ft, 125 ft oil in hole, wo, td 2515 ft. Bowman-Hicks 3, 34-8-12, cored chalk rock, show oil 2350-57 ft, arr set 6⅝-in cas 2334 ft. Bowman-Hicks 4, 34-8-12, rig up. Bowman-Hicks 5, 34-8-12, dr 1550 ft. Bowman-Hicks 6, 33-8-12, sp, dr 50 ft. Bowman-Hicks 7, 4-7-12, rig up. Sabine Lbr. Co. 1, 34-8-12, sp, set 12½-in cas 101 ft, dr 260 ft. R. L. Gay, Tr.'s Bowman-Hicks 6, 14-7-14, bailing to test 2567 ft. Sabine Lbr. Co. 3, 13-7-14, tested 250 ft oil in hole, arr deepen, td 2390 ft. Bowman-Hicks 7, 14-7-14, dk, pat. Bowman-Hicks 8, 18-7-13, dk pat. Sabine Lbr. Co. 4, 13-7-14, dk pat. A. H. Tarver's Long-Bell Lbr. Co. 1, 18-8-13, sw flow, arr kill, td 2335 ft. State Bank 1, 27-8-12, topped chalk 2332 ft, set 8¼-in cas 2333 ft, 50 ft oil in hole, wo 2480 ft. Olsan Bros.' Hooker 1, 27-8-12, topped chalk 2357 ft, set 6⅝-in cas 2333 ft, 250 ft oil in hole, wosr, td 2625 ft. Leone 1, 32-8-12, coring 2272 ft. Ohio Oil Co.'s Bowman-Hicks 3, 33-8-12, rig up. Bowman-Hicks 4, 35-8-12, rig up. Bridges-Clark Oil Co.'s Gay 1, 3-9-12, making 10 to 12 mil ft gas, 20 bbls oil, 200 bbls sw through ds, td 3274 ft, trying kill and deepen. Lion O. R. Co. & Lide et al's Sabine Lbr. Co. 2, 31-8-12, set 6⅝-in cas 2180 ft, td 2182 ft, dr in. V. M. Miller's Colquitt 1, 31-8-12, set 6⅝-in cas 2176 ft, came in flowing rate 1000 bbls day choked in, bridged over, co, td 2191 ft. W. G. Gray, Tr.'s Bolin 1, 31-8-12, set 8¼-in cas 2167 ft, td 2177 ft. Nelden 1, 6-7-12, sp, dr 50 ft. Standard Oil Co. of La.'s Nunn 1, 32-8-12, sp, dr 50 ft. Ruston Drlg. Co.'s Holliday 1, 35-8-12, set 6⅝-in cas 2322 ft, tested 100 ft oil, show sw 2728 ft, shot formation, sw, abn, td 2728 ft. Bowman-Hicks 1, 4-7-12, set 6⅝-in cas 2411 ft, dr, show oil 2473 ft, tested 35 ft oil 2534-63 ft, arr deepen. Bowman-Hicks A-1, 35-8-12, rig up. Bowman-Hicks A-2, 35-8-12, dk. Warner Quinlan's Peterson 1, set 6⅝-in cas 2170 ft, coring 2585 ft. Sabine Lbr. Co. 1, 34-8-12, set 8⅛-in cas 2326 ft, tested dry, show oil 2680 ft, sw, abn, td 2730 ft. Sabine Lbr. Co. 2, 34-8-12, lcn. Stovall Drlg. Co.'s Lefkovitz 1, 33-8-12, set 6⅝-in cas 2328 ft, bailing to test, td 2335 ft. Le Grande et al's Haley 1, 6-7-12, set 6⅝-in cas 2130 ft, tested sw 2576 ft, cmt bottom hole. Giaque 1, 6-7-12, lcn. D. H. Reddick, Tr.'s Scretchfield 1, 18-9-12, sd 2300 ft. W. D. Ball's Long-Bell Lbr. Co. 1, 35-8-13, rig up. Haynes Bros.' Meyer 1, 28-8-12, topped chalk 2288 ft, sw, abn td 2800 ft. Amerada Pet. Corp.'s Bowman-Hicks 1, 33-8-12, topped chalk 2340 ft, set 6⅝-in cas 2333 ft, wosr, td 2456 ft. J. M. Bridges McWilliams 1, 30-10-11, dr 2500 ft. Paramount O&G Co.'s Woolums 1, 11-6-12, dk. Zeke Lohman's Wyatt Lbr. Co. 1, 18-4-11, dk. Pelican Nat. Gas Co.'s La. Long Leaf Lbr. Co. 1, 4-7-11, dk. Sabine Lbr. Co. 1, 1-7-12, rig up. Ray-Dawes Drlg. Co.'s Mansfield Hdw. Lbr. Co. 1, 36-8-13, dk. Ark. Fuel Oil Co.'s Nunn 1, 32-8-12, set up 10-in cas 106 ft. Henshaw et al's Sabine A-1, 31-8-12, dk. Sabine A-2, 31-8-12, dk pat. Sabine A-3, 31-8-12, lcn. Sabine B-1, 31-8-12, rig up. C. L. Jett, Tr.'s Jones 1, 31-8-12, sp, set 10-in cas 100 ft. O'Brien Bros.' Colquitt 1, 32-8-12, rig up. E. C. Simmons' Bolin 1, 31-8-12, rig up. Air Lift Oil Co. & Root Ref. Co.'s Leone 1, 32-8-12, Joe Burnham et al's Bolin 1, 31-8-12, dk. David dk. Broderick & Calvert's Sabine 1, 31-8-12, dk pat. G. N. Broderick's Bolin 1, 31-8-12, dk. & Tyson's Neville & Roberts 1, 31-8-12, rig up. Dixie Oil Co.'s Nunn 1, 32-8-12, rig up. Floyd Oil Corp.'s Barnett 1, 31-8-12, dk. Glassell & Merren's Thomas 1, 31-8-12, dk. Hebert Oil Co.'s Noble 1, 31-8-12, lcn. Sabine Lbr. Co.'s Fee 1, 31-8-12, dk. C. E. Simmons' Leach 1, 31-8-12, lcn. W. S. Smith et al's Colquitt 1, 31-8-12, dk pat. Williams 1, 31-8-12, dk pat.

TENSAS PARISH—Willis et al's Curry 1, 39-11-12e, sd 650 ft.

UNION PARISH—Fred Stovall's 1, 32-23-4e, moved rig, high water.

WEBSTER PARISH—F. M. Fuller's Monzingo 1, 27-18-8e, sd 600 ft. Pat Hudson's Gardner 1, 1-22-11, dk. B. L. Slack 1, 36-23-11, dr 2685 ft. E. W. Bateman's Womble 3, 1-22-11, rig up. Magnolia Pet. Co.'s Denman 2, 1-22-11, set 8⅛-in cas 2737 ft, wosr, td 2749 ft. Baker 1, 35-23-11, plugged back to 3050 ft, wo, cemt to set, td 3392 ft. Phillips Pet. Co.'s Bolinger A-1, 30-23-11, wosr, td 3247 ft. Sarepta Oil Co.'s Gardner 1, 1-22-11, 600 ft fluid in hole, td 2719 ft. Merritt & Merritt's Boucher 1, 17-23-11, dr 1250 ft. Legett et al's Slack 1, 36-23-11, dk.

WEST CARROLL PARISH—Palmer Corp.'s Marston 1, 11-19-10e, fsh ds 2675 ft. H. L. Hunt's Brown 1, 4-21-11e.

## MISSISSIPPI

ALCORN COUNTY—Alcorn Pet. Co.'s Matthews 1, 14-2-7, trying shut off water at 2393 ft after shooting 100 qts nitroglycerine 2500-25 ft, td 2735 ft.

CHICKASAW COUNTY — Hightower & Golsan's Fleming 1, 20-13-3w, driving 8¼ in through quicksand, td 7280 ft. Fleming 2, 15-13-2w, dk pat.

CLAIBORNE COUNTY—Ben White's Old Hen 1, 26-10-4, sd 2004 ft.

HARRISON COUNTY — Dalton Oil Co.'s Lopez 1, 15-7-10w, lcn.

HINDS COUNTY—Mrs. Ella Rawls Reeder's State Land 1, 25-6-1e, making up 3-in dr pipe to resume dr, td 2905 ft. Jackson O&G Co.'s Mayes 1, 2-5-1e, sd, wo, td 2585 ft. Tayler 1, 35-6-1e, dk, will use gas for drilling from Mayes 1. (Taylor 1 formerly carried Mayes 2.)

LA FAYETTE COUNTY—F. E. West et al's May 1, 22-10-1w, rigged up wo.

LAUDERDALE COUNTY (Meridian Dist). Lauderdale O&G Co.'s Lackey 1, 2-7-16, set 8¼-in cas 2790 ft, td 2816 ft. Meridian Nat. Gas Co.'s Mattie Houser 1, 33-8-18, ratholing limey shale 2741 ft. Boyd Hammond's Craig 1, 2-6-14, dk.

LINCOLN COUNTY (Brookhaven Dist.)—Lincoln O&G Co.'s Pat Case 1, 21-8-6, sd 2221 ft.

LEE COUNTY — Lee County Pet. Co.'s Hickman 1, 12-8-6, sd 920 ft.

MONROE COUNTY (Amory Dist.)—Amory Pet. Co.'s Hall 1, 8-13-17, set 8-in cas 2293 ft, set 6-in cas 2333 ft, co to 2390 ft, to test gas show 2387 ft, td old hole 3045 ft. Amory Dev. Co.'s Bourland 1, 2-13-19, sd in lime, bailer in hole, td 2912 ft. Park Bowser's Cowart 1, 2-12-19, driving pipe 80 ft.

RANKIN COUNTY (Jackson Dist.)—Gulf Ref. Co.'s Rainey 1, 13-5n-1e, set 15½-in cas

WARREN COUNTY (Vicksburg Dist.)—Henderson et al's Dornbush 1, 8-18-15, sd wo with ds stuck in hole td 2475 ft, 88 ft, set 12½-in cas 960 ft, dr gray lime 1464 ft.

WEBSTER COUNTY—Cumberland Oil Co.'s Henley 1, 15-21-11, retailing leases to resume dr 1865 ft.

YALABOUSHA COUNTY (Water Valley Dist.)—J. D. Collette et al's Blackmer 1, 14-11-4w, topped red beds 2316 ft, fsh for ds in sandy gray limestone, td 2433 ft.

YAZOO COUNTY — Amerada Pet. Corp.'s Campbell 1, 24-21-2, topped Cretaceous chalk 3600 ft, coring black shale 4528 ft.

## ALABAMA

HOUSTON COUNTY—J. R. Sealey's Fee 1, 13-1n-27e, changing from cable tools to rotary, td 3100 ft.

LAMAR COUNTY — Briggs & Knapp's Wefel 1, 25-12-14, set 4⅞-in cas 1658 ft, sd 1740 ft.

LAUDERDALE COUNTY — P. J. McAlpine's O'Neal Hrs. 1, 8-2s-13w, rigged up wo.

MARION COUNTY—P. J. McAlpine's Clark 1, 22-11-14, dk pat.

MORGAN COUNTY—Albany-Decatur O&G Co.'s English 1, 6-6-4, fsh for cas, td 4130 ft.

SUMTER COUNTY—B. W. Bates' Fee 1, 3-18-1w, arr abn, td 1200 ft. Fee 2, 3-18-1w, rig up.

WASHINGTON COUNTY—Hobson et al's Wilson 1, 27-7-1w, sd in limey shale, td 881 ft. Hobson Bros. 1, 9-8-2w, sd 1450 ft. Oscar Brown's U. S. Land & Cotton 1, 25-3-2, dr below 720 ft.

## TENNESSEE

DECATUR COUNTY—Chester County O&G Co.'s Montgomery 1, set 6-in cas 1045 ft, dr 1703 ft.

EAST TEXAS—Wildcats ... ... ... .....

CAMP COUNTY—Rogers et al's Enfelt 1, Montgomery sur, sd 1920 ft.

HARRISON COUNTY — Shell Rock Pet. Co.'s Daugherty 1, W. W. Burris sur, rig up.

MARION COUNTY—A. A. Trammell, Tr.'s Hussey 1, Lockhart sur, lcn.

MORRIS COUNTY—Tucker & Fullwood's Henderson 1, J. C. Riddle sur, dk.

RED RIVER COUNTY—D. M. Buffington's Hoosier 1, Hughart sur, sd 2365 ft. Shad Harper's Garland 1, Wagley sur, sd 1862 ft. Johnson Pet. Co.'s Randolph 2, Dean sur, sd 2182 ft.

SHELBY COUNTY—Chapparral Oil Co.'s Holt 2, Matthew Moore sur, co, td 3004 ft, Benedum & Trees' McCann 1, Nancy Beattie sur, set 9-in cas 2762 ft, td 2832 ft.

TITUS COUNTY—Canadian Oil Co.'s Walcott 1, D. N. Smith sur, dk.

## MOUNTAIN STATES

### NEW MEXICO

CHAVES—Warman Oil Trust, Blackdome 1, ne 27-13s-24e, fsh 4024 ft. Cactus Dev. Co., Sullivan 1, se 14-10s-26e, dr 1945 ft.

DE BACA—Matador Oil Co., Wood 1, sw 6-4n-20e, wtg for pipe a t2730 ft.

EDDY—Van Horn et al, se 18-19s-26e, dr 1235 ft. R. D. Compton, State 1, nw 2-20s-25e, dr 815 ft. Henderson et al, Arnold 1, se 23-17s-30e, dr 3420 ft. Henderson et al, Grier 1, nw 21-16s-31e, drilling at 1245 ft. Welch et al, State 1, sw 27-17s-28e, abn 2520 ft. Flynn-Welch-Yates, State 57, 19-19s-28e, dr 2930 ft. Flynn-Welch-Yates, Stephens 1, sw 13-17s-30e, dr 1629 ft. Lockhart et al, Beeson 2, ne 28-17-30e, dr 2916 ft. Lockhart et al, Parke 3, sw 15-17s-30e, dr 75 ft.

GUADALUPE — Los Angeles - Hollywood Synd., McMullen 1, sw 24-5n-16e, may change location.

LEA—Shell Pet. Corp., State 1, ne 32-18s-

# In France, it was *obey the last order first* ..

# In the Norvell-Wilder organization it is, *obey the buyer's order first*

In the shifting tides of battle along the western front there was little time for line officers to get in touch with G. H. Q. at Chaumont. A machine gun nest had to be stamped out — guns had to be mounted — supplies had to be brought up. The old military principle prevailed that when emergency orders conflicted with staff orders the good soldier was to obey the last order first. Time later to go back and justify the action. The needs of the moment were more pressing

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## Norvell-Wilder Supply Company

BEAUMONT HOUSTON SHREVEPORT FORT WORTH

38e, ready to spud Empire, State 3B, se 5-21s-35e, plugging 4695 ft. Empire, Lindley 2, se 14-25s-36e, dr 2867 ft. Continental, Sholes 2, nw 13-25s-36e, rigged and sd. Continental, Myers 1, nw 28-22s-36e, gassing at 3765 ft. Walker et al, Terry 2, se 10-19s-38e, spudded and sd. Humble O. & R. Co., Lindley 3A, sw 13-25s-36e, dr 600 ft. Humble, Koonce 1, ne 14-25s-36e, 125 bbls at 3327 ft. Rector Oil Co., King 1, ne 26-25s-32e, sd at 4100 ft. Magnolia Pete Co., Lindley 1-X, ne 26-25s-36e, 160 bbls at 3325 ft. Bordages et al, Hughes 1, 27-19s-38e, pipe trouble 4012 ft. Morton et al, State 1, nw 32-11s-38e, sd 3725 ft. Barnsdall Corp., 1, se 28-16s-38e, dr 5140 ft. Cranfill & Reynolds, State 1C, sw 16-23s-36e, dr 3045 ft. Fisher & Lowrie, State 1, nw 11-18s-36e, standardizing at 2100 ft. Texas Pacific, State 3, nw 21-23-36e, show oil at 3680 ft. Walker et al, Terry 2, se 10-19s-38e, spudded and sd. Cranfills & Reynolds, State 1-D, lot 6, Sec. 3-21s-33e, dr 1725 ft. Harrison et al, State 1, sw 35-18s-38e, sd 565 ft. Ohio Oil Co., Northrop 1, se 32-18s-38e, dr 350 ft. Ohio, McDonald 1, 15-22s-36e, rig.

McKINLEY—J. W. Halsell, Santa Fe 1, 17-18s-9w, dr 3090 ft. San Juan Coal & Oil Co., 1, se 21-18n-9w, sd 2205 ft. Williams et al, Santa Fe 1, se 19-18n-8w, wtg casing at 1900 ft. Cravens et al, 1, 7-18n-9w, 365 ft.

RIO ARRIBA—Berringer et al, Hartman 1, ne 8-29n-7w, preparing to resume at 825 ft. San Juan Pete Co., Government 1, sw 14-30n-7w, sd 270 ft.

SAN JUAN—Dorothy Oil Co., Terwilliger 2, 29-30-9w, dr 1181 ft. Southern Union Gas Co., Day 1, sw 20-28n-10w, skidding rig and starting new hole. Blackrock Oil Co., Blackrock 1, se 11-25n-13w, wtg on extension permit with td 1550 ft. Greathouse et al, Roderick 1, se 11-22s-14w, sd 1000 ft. Childers Dr. & Pr. Co., Westwater 2, nw 24-31n-16w, sd 2525ft. Reserve Oil Co., Shaffer 2, ne 1-21n-14w, sd 780 ft. Southern Union Gas Co., Kutz Canon 3, 11-27n-11w, dr 1248 ft. H. L. Williams, Bowman 1, ne 30-30n-15w, dr 2460 ft.

SANDOVAL—Virginia-Mex O. & G. Co., Marion 1, se 23-20n-2w, tools lost at 1150 ft.

SAN MIGUEL—Pioneer O&G Co., Thunder Bird 1, nw 14-15n-16e, dr 2268 ft. Starr Oil Co., Adams 1, ne 25-17n-17e, stand 3348 ft. Cibola Pete Co., Crown 1, se 9-13n-14e, ready to resume 320 ft. Hershfield Dev. Co., Cabra Springs 1, ne 21-12n-22e, sd 730 ft. Benedict et al, Wilson 2, nw 25-17n-16e, ready to spud.

SOCORRO—Lockhart & Co., Stackhouse 1, 14-3s-6e, dr 1885 ft.

TORRANCE—Williams et al, Staplin 1, ne 16-8n-10e, dr 1741 ft. J. B. Witt O&G Co., Kutchem 1, 12-7s-7e, dr 65 ft.

VALENCIA—Rio Puerco Oil Co., N. M.-Ariz. Land Co., 2, ne 13-6n-2w, wtg for pipe 3145 ft. Acme Oil Co., N. M.-Ariz. Land Co. 1, 26-6-3, water trouble 4535 ft. Harlan et al, Harlan 1, 5-6n-2e, dr 4100 ft.

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*General Offices*
ARKANSAS CITY, KANS. KANSAS CITY, MO.


## WYOMING

BIG HORN—P. & R. Gov't 3, 24-56-98, sd 4183 ft. Westland Oil, Inc., 24-54-95, sd 360 ft. Wisconsin Holdings, 4-55-97, sd 665 ft. Yellowstone Pete Co., 7-57-97, dr 2600 ft.

CARBON—P. & R., 2-19-88, sd 4562 ft. C. E. Bivens et al, Baggs 1, 35-13-92, sd 2200 ft.

CONVERSE—Pioneer Oil Co., 5-31-70, cem at 3270 ft and resumed dr.

FREMONT—Texas Prod. Co., State 1, 36-34-95, dr 2914 ft.

HOT SPRINGS — Midwest, 8, 6-44-98, sd 1052 ft. Ohio Oil Co., Smith 1, 8-46-99, dr 3134 ft. Gebo Consolidated, 1, se 23-44-95, sd 1245 ft. C. E. Robertson et al, se 17-43-92, sd 450 ft.

JOHNSON—United Oil Co., 7-47-82, sd 360 ft. R. C. Tarrant, 4-43-82, sd 600 ft. Dome Synd., 3, 4-43-82w, sd 720 ft.

LINCOLN—Midwest, Grey's River 1, 25-37-117, sd 1731 ft. Midwest, Waterfall 1, 35-22-115, sd 3510 ft. Mtn. Oil Corp., 36-25-115, sd 100 ft.

PARK—P. & R. Pitchfork 1, 14-48-102, sd 1400 ft. Henderson Prod. Co., 31-58-99, sd 3000 ft. Ohio Oil Co., Burlington 1, 21-53-101, dr 4438 ft. Resolute Oil Co., 17-27-101, prep to resume 4280 ft. Cody ePte Corp., Danker 1, sw 22-57-98, sd 2697 ft.

SWEETWATER—Mtn. Fuel Supply, Tucker 1, 18-13-99, sd 2900 ft. Mtn. Fuel Supply, Cappers 1, 2-19-104, sd 3200 ft. Mtn. Fuel Supply, U. P. 1, 13-19-104, sd 3100 ft. Vermillion Oil Co., 1, sw 16-12-99, cem 13-inch at 1600 ft, dr 1700 ft.

UINTA—California Co., U. P. 1, 7-17n-119, cem cas, td 4635 ft.

WESTON—Gose Synd., 28-47-65, sd 4004 ft.

## IDAHO

BANNOCK—Norton Bros. et al, Marsh Valley 2, lot 5, Sec. 19-10s-37e, dr 2600 ft.

CLARK—Monida Oil Co., Beaver Dome 1, nw 32-14n-36e, repairs at 1140 ft.

POWER—Gem Pete Co., Arbon Valley 1, nw 2-11s-33e, sd 3800 ft.

TETON—Grand Teton Oil Co., Horseshoe 1, se 33-5n-44e, 10-inch cem at 1930 ft, td 1976 ft. Teton Land & Leasing Co., Bevan 3, se 28-5n-44e, dr 1540 ft.

## MONTANA

BIG HORN — Montana Production Co., Lynde 2, se 21-6s-35e, sd 3056 ft.

CARBON—Atlantic Oil Co., 2, 20-7s-24e, sd in Madison 1840 ft.

CARTER—Carter & Co., 1, nw 11-2n-58e, plug back to 2030 ft, to test. Montesota Oil & Dev. Co., 1 ,se 7-8n-58w, set 5-3/16-inch at 930 ft. Poss Pete Corp., nw 7-8n-57w, sd 2505 ft.

CASCADE—Piegan et al., 36-20n-3w, fsh lost tools 2120 ft. Eden Oil Co., 1, sw 27-18n-4e, sd 1325 ft.

CUSTER—Montana Belle Oil Co., 1, ne 28-8n-45e, sd 4562 ft.

DANIELS—Whitetail Oil Synd., 1, nw 10-36n-50e, sd 1467 ft.

FERGUS—Melton Corp., sw 24-21n-17e, td 2700 ft.

GALLATIN—California Co., Ringling 1, se 35-5n-7e, dr 3657 ft.

GARFIELD—Montana Corp., State 1, ne 36-16n-38e, dr 3075 ft last report.

GLACIER—Kootenai O. & G. Co., 1, 13-35n-6w, sd 250 ft. Fulton Pete Co., Hannah 1, ne 28-36n-12w, rig up. Rim Rock Oil Co., Brown 1, se 29-35n-5, rig up.

LIBERTY — Square Deal Oil Co., Federal Landbank 1, 1-32n-7e, try water so, td 3470 ft. Thompson, Thompson 1, sw 7-34n-4e, sd 2314

ft. Northland Oil & Gas Co., Yurman 1, 35-33n-6e, sd 1030 ft.

MUSSLESHELL — Minnesota-Flatwillow, Ivanhoe Dome 1, 7-11-31, spd and sd.

PETROLEUM—Minnesota-Flatwillow, 2, sw 5-12n-25e, to dd from 1558 ft.

PONDERA—Hiland-VanDeale, Kendall 1, ne 35-30n-3w, td 4215 ft. Miller Bros., Bruins 1, nw 17-28n-1w, rig up.

ROSEBUD—Prairie O. & G. Co., N. P. 1, 9-10n-29e, sd 2310 ft. Prairie, N. P. 3, 26-10n-30e, dr 2100 ft. Prairie, N. P. 4, 28-10n-38e, sd 65 ft.

SHERIDAN—Sheyenne O. & G. Co., nw 15-36n-53e, to resume at 1400 ft.

SWEETGRASS—Shoshone Consolidated, N. P. 1, nw 23-2n-15e, sd 5805 ft.

TETON—Andover Oil Co., Carlson 1, ne 5-24n-4w, to resume at 150 ft. L. B. O'Neil, State 1, nw 15-25n-5w, sd 2305 ft. Newman et al, Fitzgerald 1, 26-32n-1w, rig up. Rocky Mtn. O&G Co., Salmond 1, ne 4-23n-8w, run cas, td 1160 ft. Earl Corp., 1, se 22-22n-82, sd 660 ft.

TOOLE—Monalta Oil Co., Buckley 1, se 1-37n-4w, dr 2290 ft. Monalta Oil Co., Buckley 2, sw 1-37-4w, rig. Anaconda Pete Co., Barthelote 1, ne 19-36n-2w, sd 1635 ft. Mahan et al, Lee 1, 10-31n-1w, sd 2264 ft. Roxana Drlg. Co., Toole 1, 22-36n-1e, sd 1700 ft. John Thomas et al, Buckley 1, ne 1-37n-4w, cem 150 ft. Black Gold ePte Co., Syrs 1, sw 30-36n-28e, dr 800 ft. F. & F. Oil Co., Swenson 1, se 12-33-1e, repair engine, td 200 ft. Mid-Continent O. & R. Co., Farbo 2, ne 2-37-4w, spd.

## COLORADO

ADAMS—N. M. Slatt, Hill 1, se 27-35-64w, dr 1069 ft.

ARAPAHOE—McDeb Drilling Co., Fitzsimmins 1, se 7-4s-66w, fsh 5090 ft.

ARCHULETA — Outwest Investment Co., Fitzhugh 1, sw 34-33n-1e, spudding.

BENT—Continental, Pipe Springs 1, se 27-27-49, dr 5534 ft.

BOULDER—Reliance Oil Co., Erickson 1, nw 33-2n-70w, dr 3045 ft.

DELTA—Crawford O&G Co., McKissen 1, ne 28-15-91, prep to resume 970 ft.

ELBERT—Belmont Oil Co., Maher 1, se 4-6s-59w, standardizing 3720 ft.

FREMONT—Westerville Oil Co., State 1, nw 16-18-69, sd 1214 ft. Continental, Harding 2, sw 21-18-70, dr 550 ft. Continental, Steinmier 4, se 35-18-70, dr 2120 ft. Standard of Colo., Tiger 1, nw 26-19s-89w, sd 1656 ft, indefinitely. Hammond & Roscoe, Beltrame 1, se 1-19s-70, sd 1800 ft.

JACKSON—Midwest, Rich 21X, nw 9-6n-80w, sd for winter 3381 ft. P. & R., Hendershot 1, ne 2-6n-81, sd for winter 3610 ft.

JEFFERSON—Ruby Hill O&G Co., Braden 1, se 24-4s-69w, to ur to 3678 ft.

HUERFANO — Parker Club and Kinney-Coastal, Fee 1, se 4-28s-68w, reaming to 4030 ft. Elliott et al, Abeyta 1, nw 31-27s-65w, lcn.

LAS ANIMAS—Trinidad Dev. Co., Flontz 1, sw 23-32-63, set 5-3/16-inch at 2700 ft, water trouble. Helium Co., Morris-Cowdery 3, nw 35-29s-60w, dr 1075 ft.

LARIMER—Mosher et al, Reed 1, nw 28-4n-69w, dr 3600 ft. Barrows et al, Barrows 1, se 7-11-68, sd 2310 ft. Continental, Scott 5, nw 6-19n-68w, dr 3210 ft. Deininger et al, Rembey 1, ne 35-4n-70w, to resume at 354 ft.

LA PLATA—Royal P. & R., Red Mesa 1, ne 27-33n-12w, sd 360 ft. Detroit Oil Assn.'s Olbert 1, sw 9-35n-12w, dr 2230 ft.

LINCOLN—Kelly Oil Co., State 1, ne 36-14n-57w, sd 2970 ft.

MESA—Argo Oil Co., Hoel 1, ne 23-8s-104w, jar on pipe, td 2720 ft.

MOFFAT—McLaughlin et al, Williams 1, 2-3-92, prep to ream to 4385 ft. Mtn. Fuel Suply, Lasher 1, ne 25-12n-101w, cas 1750 ft. 642 ft. Vermilion O&G Synd., 1 se 23-9n-100w, sd 642 ft. Texas Prod. Co., Berlin 1, ne 18-12n-100w, muddy 6¼-inch and 8⅝-inch 2347 ft. Texas Production Co., Knowlton 1, 33-5n-91w, rig. Midwest, Hannawalt 24, se 4-6n-92w, dr 1625 ft. F. McCormick, Sales 1-A, se 28-4n-92w, sd 3190 ft.

MONTROSE—Uncomphagre O&G Co., Colorado 1, nw 27-50-10, resuming at 2031 ft.

PUEBLO—Beulah Dome Co., Hedland 1, sw 7-23-67w, sd 932 ft.

RIO BLANCO — Texas Production, Potter 1, se 30-2n-69w, sd to repair boiler, td 5868 ft. White Eagle, Fordson 1-A, sw 9-2s-96w, ur to 3010 ft.

ROUTT—Gillespie et al, Omholt 1, se 29-4n-79w, ready to spud. Ruby Hill O&G Co., State 2, nw 17-6n-86w, plug back from 3127 to 2250 ft and testing production.

WELD—Platte Valley Pete Corp., Patterson 1, se 24-6n-61w, sd 4985 ft.

WASHINGTON—Middlemist Oil So., Middlemist 1, se 14-3s-56w, set 15½-inch casing at 1030 ft.

YUMA—Phillips Pete, Andrews 1, nw 3-25-42w, dr 4912 ft. Major Pete Co., Black Wolf 1A, 7-2s-43w, sd 1535 ft.

## NORTHERN CALIFORNIA

| Company, Well and Location | | Initial Production Bbls. | Depth |
|---|---|---|---|
| KING COUNTY— | | | |
| Oceanside Oil Co., Thomas 4, 32-22-16 | | * | 290 |

## KERN COUNTY

BELRIDGE—Elmer Oil Co.'s No. 1, 2-29-20, co 3975 ft. J. H. Kennedy's No. 1, 5-29-21, dr gray sand 1400 ft. K. C. Wallace's No. 1, 32-29-21, dr out cmt below 6¼-in cas 2590 ft.

BUTTONWILLOW—General Pet.'s Morris 1, 6-28-23, rigging rotary. Milham Pet. Co.'s Kern 6, 8-28-23, co 4945 ft; Kern 7, 5-28-23, rigging rotary; Kern 8, 5-28-23, rigging rotary; Kern 9, 5-28-23, rigging rotary; Kern 10, 5-28-23, rigging rotary.

EDISON—F. M. Sayre's No. 1, 5-30-29, dr hard sand and shale 4205 ft. Shell's No. 2-1, 33-29-29, coring 2228 ft. Texas' Newman 1, dr shale 6030 ft.

GOULD HILLS—Bomka and Ball's Larson 1, 12-29-20, dr shale 2628 ft. Cara Mira Oil Co.'s Theta 1, 20-28-20, dr shale 3045 ft.

JASMINE—Helen Pet. Corp.'s No. 1, 23-25-27, dr sandy shale 1478 ft.

McKITTRICK—Ozena Oil Co.'s Kendon 2,


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**At the right, is shown a Sullivan Balanced Angle Compressor testing on the 16-inch Uinta pipe line between Baxter, Wyoming, and Salt Lake City. These compact machines, mounted on skids, can be dragged from place to place easily, for testing lines or operating pneumatic tools—getting work done quickly at low cost. Catalog 83-G. 83-G.**

**Below, a Sullivan Portable Compressor and Sullivan Spaders are shown digging a pipe trench in Dallas, Texas. Sullivan Portable Compressors, available in a wide range of sizes and mountings, and an outfit of Sullivan Rock Drills, Concrete Breakers, and Clay Spaders, make you less dependent on hand labor and save you money.**

*Sullivan Spaders excavating a pipe trench*

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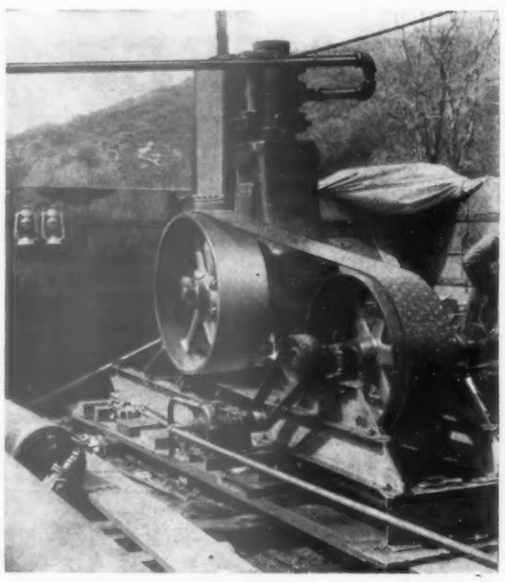

*Sullivan Balanced Angle, High Pressure Compressor testing pipe lines*

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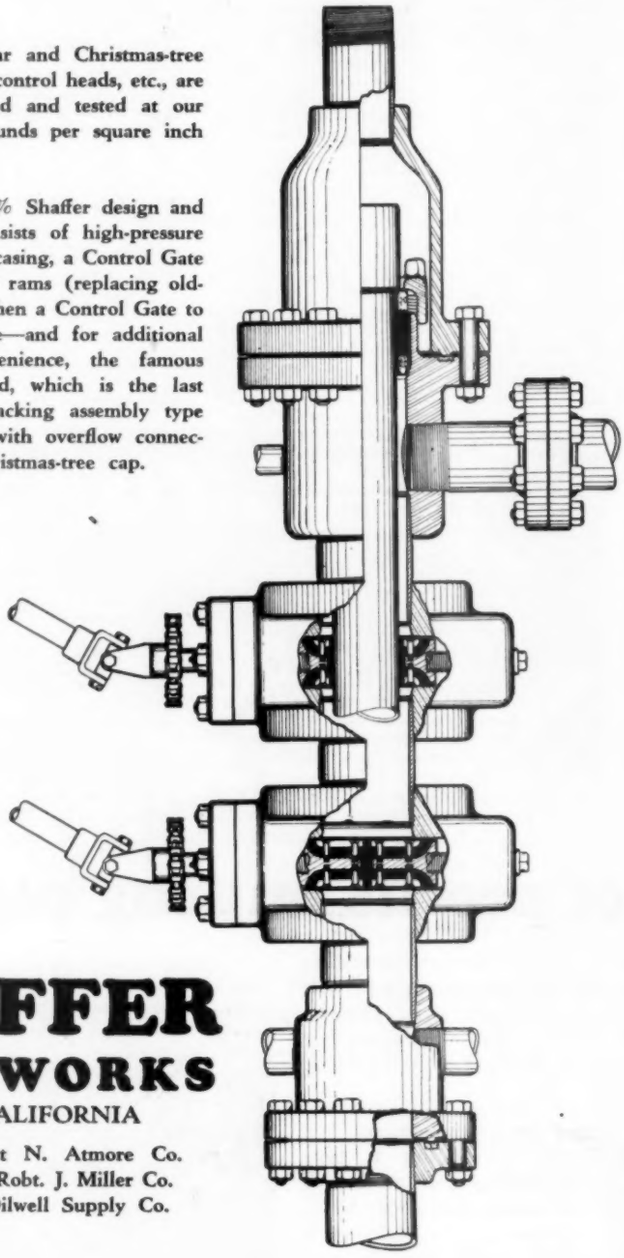
This assembly is 100% Shaffer design and manufacture, and consists of high-pressure mud-cross, flanged to casing, a Control Gate with complete shut-off rams (replacing old-style drilling valve), then a Control Gate to close round drill pipe—and for additional protection and convenience, the famous Warren Control Head, which is the last word in improved packing assembly type blow-out preventors, with overflow connection and flanged Christmas-tree cap.



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27-29-21, dr gray sand 2606 ft. Ohio's M. M. 1, 32-20-22, dr shale 3488 ft. H. L. Whiston's Wisecarver 1, 30-30-22, making 25 bbls oil and small amount gas, td 5035 ft.

MIDWAY — Shell's Perris 1-A, 15-32-23, plugging back from 8195 ft. Standard's Mascot 1, 26-32-23, dr brown shole 9150 ft. Union's Reeves 1, 27-32-22, grading for rig.

ROUND MOUNTAIN—Gerrard and Phillips' No. 1, 32-27-29, re-dr 1188 ft.

SAN EMIDIO—H. A. Bardeen's Klipstein 1, 18-10-23, sp.

SHALE HILLS—Girard Oil Co.'s Watkins 1, 28-26-18, dr shale 430 ft.

TEMBLOR HILLS—Kent and McDonald's No. 1, 3-32-22, dr shale 1080 ft. Shell's Gonyer 1, 32-23-23, dr hard shale 2255 ft.

WEED PATCH—Shell's Porter Day 1, 29-30-29, dr gray sand 800 ft.

### SANTA BARBARA COUNTY

ARROYA PARIDA—Shell's Fithian 1, 18-4-25, sr 2325 ft.

BUELL CANYON—Union's Buell 1, dr shell 3755 ft.

CARPENTERIA—Continental's Bailard 124-1, 33-4-25, dr shall and shale 1365 ft.

CASITAS—Standard's Shepard 1, 26-4-25, 16-in cas cmt 1280 ft, td 1385 ft.

CASMALIA—Wildcat Oil & Royalty Co.'s Donovan 1, 20-10-35, dr 4288 ft.

GOLETA—F. G. Anderson's Langman 1, 10-4-28, flowing water, td 4720 ft. Walter Barnhart's Pomatto 1, 1-4-29, 10-in cas cmt 1790 ft, td 2155 ft. General Pet.'s Crandall 138-1, dr shale 2323 ft; More 1, flowing gas, td 4535 ft; More 2, co 4327 ft. Standard's Edwards 2, dr shale 3005 ft.

LOMPOC — Ohio's Hollister 1, 2-6-34, dr shale 2300 ft. Prairie Oil & Gas Co.'s Schyvers 1, 15-7-35, dr shale 466 ft.

LOS OLIVAS—L. B. Tannehill's McGilvray 1, 23-7-31, dr gray sand 4020 ft.

ORELLA—General Pet.'s Erburu 3, flowing 100 bbls, td 1603 ft. Oakburn Oil Co.'s Permit 1, pumping oil and sand, td 1312 ft. Shell's Rutherford 3, 1-4-31, sr 540 ft.

POINT CONCEPCION—Standard's Gerber 1, sr 4120 ft.

SANTA MARIA — O. C. Field Gasoline Corp.'s Norswing 1, 8-9-33, sp. Shell's Careaga 1, coring 5618 ft.

### VENTURA COUNTY

CONEJO—American Oil Co.'s No .1, 33-2-20, dr rock 1414 ft. Triunfo Oil Co.'s No. 1, 24-1-19, 6¼-in cas cmt 1580 ft, td 1607 ft.

OJAI — California Ventura Oil Co.'s La Crosse 1, co 5525 ft. Continental's No. 3, 21-4-22, dr shell 5378 ft. Gilmore-Bishop's Pirie 1, 8¼-in cas cmt 2270 ft, td 2710 ft.

SULPHUR MOUNTAIN — M. K. T. Oil Co.'s No. 1, 13-4-22, dr shale 5755 ft.

OXNARD—Shell's Pfeiler 1, new lcn.

PIRU—Bolsa Chica Oil Corp.'s Snow 1-A, 4-4-18, dr shale 1926 ft. E. A. Fennell's Lankershim 1, 13-4-19, dr hard sand 1382 ft.

HOPPER CANYON—George H. Hadley's No. 1, 13-4-9, dr shale 629 ft.

RINCON CREEK—Associated's Snowball 1, 19-4-24, dr red shale 1055 ft.

CALABASAS WEST—Olympic Corp.'s Calabasas 1, 18-1-17, dr shale 2029 ft.

SANTA PAULA—Empire Oil Co.'s Steen 4, 13-4-21, dr shale 3067 ft. Universal Exploration Co.'s Anlauf 2, 21-4-21, lcn.

SATICOY—Standard's Citrus 5, 10-2-22, dr shale 8528 ft.

SIMI—Richfield's Pan 42, 36-3-18, pumping some oil, td 2420 ft.

TIMBER CANYON—Southern Exploration Co.'s Canyon 1, 18-4-20, re-dr 2212 ft.

VENTURA—Prairie Oil & Gas Co.'s Sexton 1, surveying hole, will deepen, td 4457 ft.

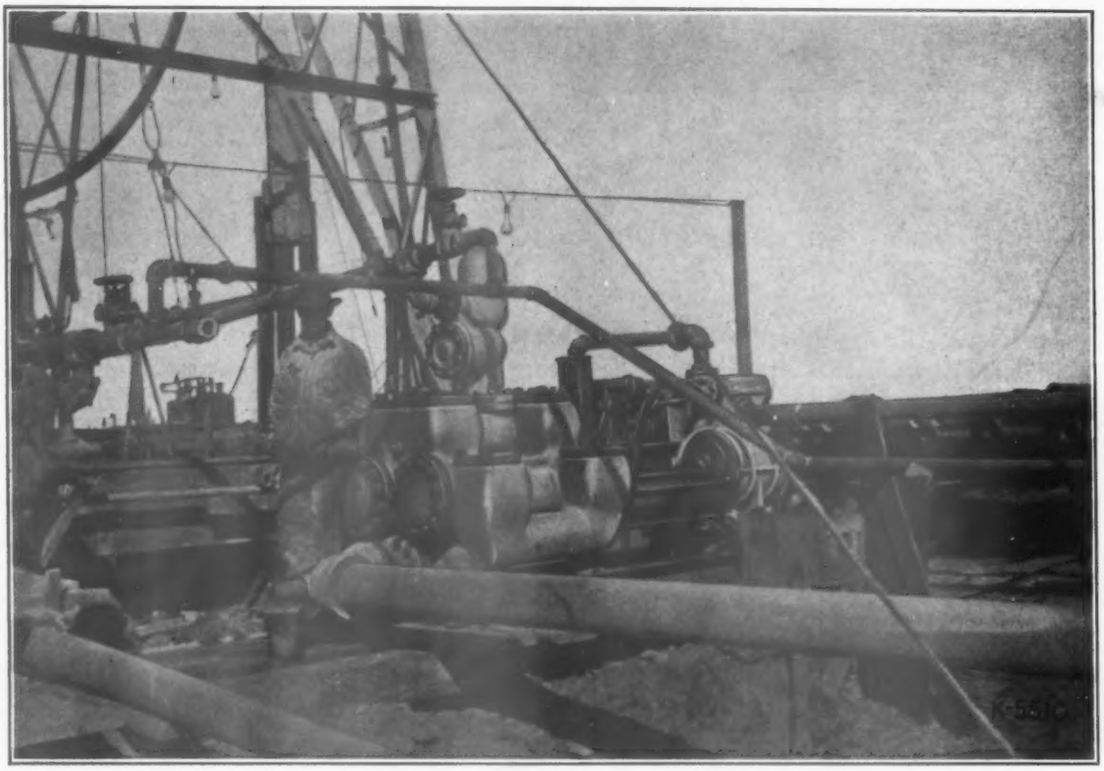
### MISCELLANEOUS

FRESNO COUNTY — Petroleum Securities Co.'s Ladd 1, 28-20-16, sd 7380 ft. Currency Pet. Co.'s No. 1, 28-21-14, dr shale 3575 ft. Western Gulf's Welsh 1, 26-15-12, dr shale 3100 ft.

KINGS COUNTY—Wellport Oil Co.'s No. 1, 9-24-17, dr shale 2940 ft.

MADERA COUNTY — George F. Getty's Chow Chilla 1, 8-10-14, dr 168 ft. Twin State Oil Co.'s Soldani 1, 14-12-17, dr black shale 2323 ft.

MONTEREY COUNTY—Pacific Inland Oil



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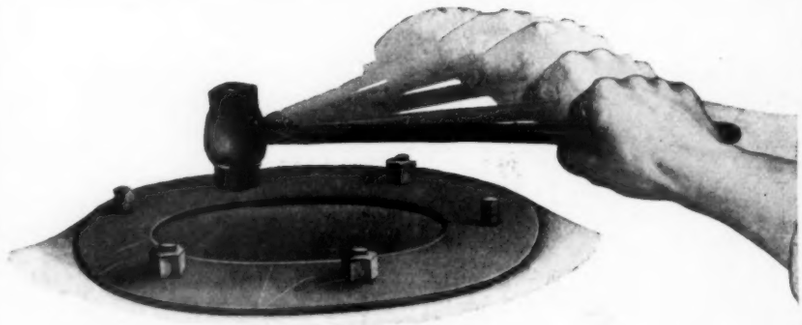

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Co.'s Braden 1, dr rock 150 ft. Standard's Piedmont 1, 23-22-7, dr shale 3674 ft. Union's Paige 1, 8-22-8, dr shale 2900 ft. Shell's Dudley 1, 15-22-9, testing above 5475 ft.

SAN JOAQUIN VALLEY — Barnhart Oil Trust's Gilbert 1, 3-2-10, dr shale 2555 ft.

SAN LUIS OBISPO COUNTY — Paso Rolebs Synd.'s Emerick 1, 34-27-15, 8¼-in cas cmt 3675 ft. Midwest Oil Co.'s Hately 1, 34-31-15, dr shale 3838 ft. Pismo Dome Oil Co.'s Pricco 1, 5-31-13, fsh for tools 1100 ft. San Luis Synd.'s No. 1, 29-31-13, dr shale 3650 ft. Texas Pacific Coal & Oil Co.'s No. 1, 25-32-14, fsh 4000 ft. Union's Chandler 1, 12-32-14, dr shell 5555 ft.

TULARE COUNTY—Terra Bella Oil Co.'s Gardiner 1, 35-22-27, water not shut off on 8¼-in cas at 830 ft. Roy White's No. 1, 8-23-26, dr 4030 ft.

## SOUTH CALIFORNIA

**Completion**

PUENTE—
The State Co., Puente 1 ..... * 4520

BANDINI—George F. Getty's Kellam 1, dr hard sand and shale 4040 ft.

BELLFLOWER — Clearwater Pet. Co.'s Candler 1, dr shale 5115 ft.

CALABASAS—J. W. Martin's No. 1, dr shale 1165 ft.

COMPTON—California Well Drilling Co.'s Del Amo 1, sd 8500 ft.

EL MONTE — Morgan West's Sing 1, dr hard sand 1878 ft.

HERMOSA — California Ventura Oil Co.'s Smith 1, will deepen from 5030 ft.

LA HABRA—R. C. Rucker's Grazide 1, dr shale 3404 ft. Union's Sansienna 11, 13⅜-in cas cmt 2050 ft, td 2105 ft.

NEWHALL—Consolidated Oil Co.'s Hammond 1, rolling out cas, td 1155 ft. Pico Dome Oil & Gas Co.'s No. 1, co 660 ft. Pioneer Pet. Co.'s Cannon 1, dr shale 438 ft.

NEWPORT—Mesa Pet. Corp.'s B. G. 1, pumping water, td 4910 ft.

POMONA—Grimes-Girrard's No. 1, dr 655 ft.

PUENTE—Western Gulf's Diamond Bar 1, dr hard sand 3350 ft.

RICHFIELD—Weber and O'Brien's Brown 1, fsh for tub 5350 ft.

SAN FERNANDO—Shell's Andrews 1, rig.

SAN JOSE HILLS—Richfield's Benadette 1, lcn.

SOUTH LOS ANGELES—William Drillers' No. 1, dr hard sand 4414 ft.

TELEGRAPH CANYON—Union's Rimpau 1, dr granite 3328 ft.

WHITTIER—Tureco Oil Co.'s Cole 1, lcn.

WILMINGTON—Archer Oil Co.'s Watson 1, fsh 5555 ft.

RIVERSIDE COUNTY—L. R. Clark's No. 2, 5-3-2, re-dr 1765 ft. Hall Pet. Corp.'s Watt 2, repairing rig 676 ft. Hemet Pet. Corp.'s Ward 1, dr shale 3555 ft. Trabuca Oil Co.'s No. 1, 28-4-6, dr hard sand 4305 ft.

SAN BERNARDINO COUNTY — Marcell Pet. Co.'s Marie 1, 31-2-8, dr shale 1600 ft. Western Pacific Oil Co.'s No. 3, plugging back from 3370 ft.

## SOUTHWEST TEXAS

ATASCOSA COUNTY—Frontier Oil Co.'s Hoffman 1, dr about 1640 ft.

BASTROP COUNTY — Abernathy et al's Aldridge 1, dr at 2280 ft. Batt's Alexander 1, dr at 1480 ft. Gulf's Bell 1, dr 720 ft. Harper et al's Mitchel 1, dk. Humble's White 1-A, lcn. Kate et al's Lacky 1, spud in. Superior Oil Co.'s King 1-A, lcn; Lasher 1, dr about 650 ft.

BEXAR COUNTY—Burton Oil Co.'s Shook 1, dr 1730 ft. Dingman-Schimmil's Kelso 2, to make lcn. Leon Creek Oil Co.'s Reininger 1, dr. Mayfield Park Properties' Mayfield Park 1, dr. Moore and Juar's Ellison 1, sd around 2000 ft. Wallace et al's Dullnig 1, dr 1821 ft.

BEE COUNTY—Fischer et al's Kimball 1, dr about 550 ft. Houston Oil Co.'s Portis 1, dr around 450 ft. Morgan Oil Corp.'s McKinney 1, dr 980 ft; Ray 2, moving on. Mauldine Bros.' Kilden 1, spud in. Nicholes et al's Hicks-Hahl 1, lcn; Hicks-Hahl 2, lcn. E. S. Price, Weiss 1, ru; Weiss 2, lcn. Texas Co.'s Tips 3, dr 2840 ft; Lasiter 1, dr 920 ft. Union

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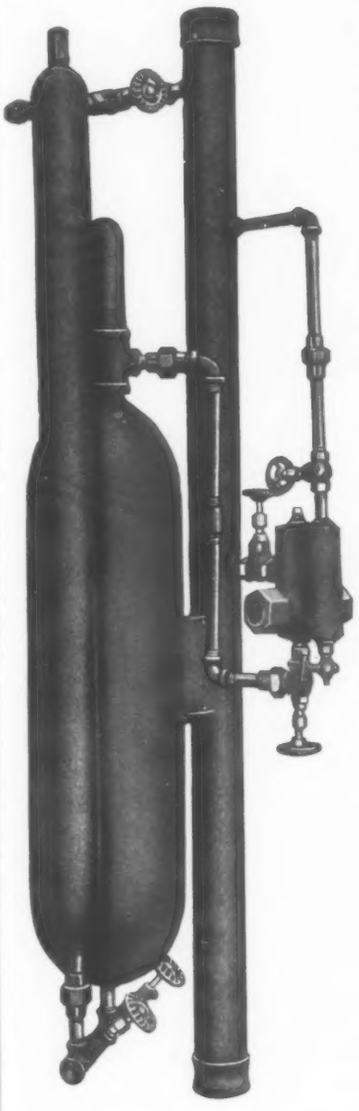

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*Prince & Prince, Electra, Tex.*
*Clark & Cowden, Duncan, Okla.*
*Hartman & Hamilton, Seminole, Okla.*
*Independent Oil Co., Okla. City*
*G. E. Gilberth, Okla. City*
*Golden & Cochran, Wink, Texas.*
*Haynes Drilling Co., Wink, Texas.*
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*Fain McGaha, Wichita Falls, Texas*
*Alleson & Clevinger, Seminole, Okla.*
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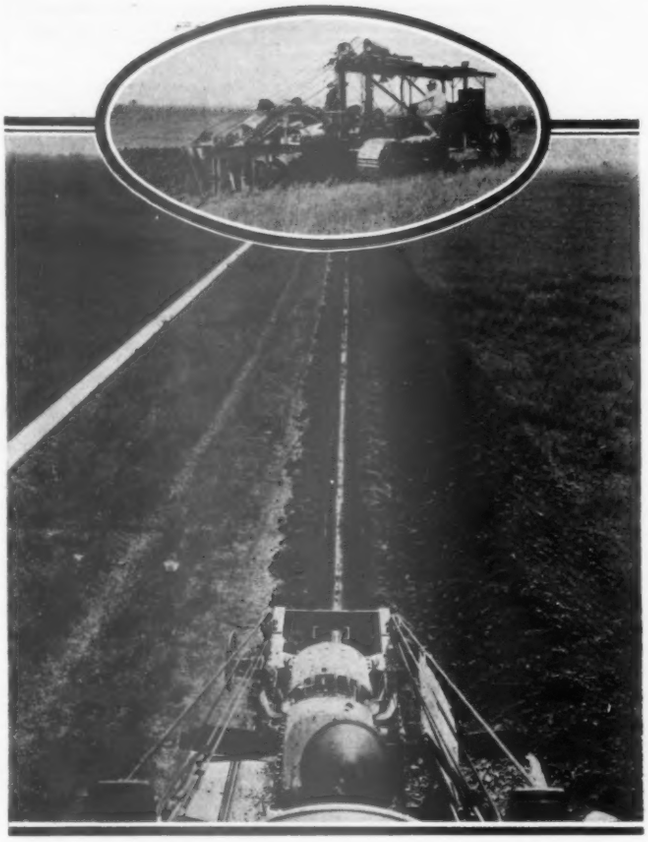

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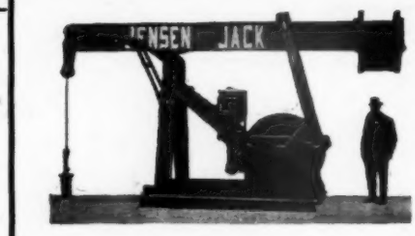


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Prod. Co.'s Ray 6, abn at 5082 ft; Ray 5, set casing at 3952 ft, plug being drilled.

BROOKS COUNTY — Houston Oil Co.'s Holbein-Wormser 1, dr at 4653 ft. Humble's Singer 1, dr 3343 ft.

CALDWELL COUNTY — Cade-McMurtray et al's (near Bastrop-Caldwell County line), dr. Buchanan et al's Cude 1, prod. around 260 bbls at 2185 ft. Cranfill-Reynolds Stawn 1, dr at 1940 ft. Keene et al's McNeil 1, dr around 1540 ft. Stone et al's Croyne 1, dr. Humble's Tiller 4-B dr. Morgan et al's Perry 1, prep to spud. McIntyre's Townes 1, sd at 2630 ft. Sun Oil Co.'s Cude 1, pumping about 60 bbls at 2105 ft. Trinity Drillers' McMullen 1, dr at 800 ft.

DUVAL COUNTY—Allied Gas Co.'s J. T. Dinn 1, dr at 2670 ft. Buckner et al's Peters 1, prep to spud; Bruni 1, dr. Callahan and Howard's Luby 1, moving on. Cole Pet. Co.'s Benavides 68, blk 11, Sec. 14, dr at 1000 ft. Humble's Kohler 43, ru. O. W. Killam's Bruni 17, dr. Long et al's Hahl 3, lcn. Magnolia's King-Harper 2, lcn; Benavides 6, casing being set at 2814 ft, prod. 60 bbls at 2820 ft. National Oil Co.'s Ball 2, dr at 3206 ft; Peters 1, dr at 600 ft. Sims Oil Co.'s Dinn 9, setting up. Southern Oil Co.'s Welder-Woods 1, standing at 7500 ft. Everett Suladie's Peters 1, Sec. 33, dr at 2345 ft. Trapshooter Reilly's Hahl 4, dr. Zoch et al's King 1, dr at 3712 ft.

FRIO COUNTY—Lefevre et al's Eschenburg 1, prep to spud in.

GOLIAD COUNTY—Humble's Lackey 1, lcn. William F. Morgan's Ray 1, dr 2680 ft.

GONZALES COUNTY—Acme Oil & Royalty Co.'s Weber 1, dr 2310 ft. Beeman and Station's Station 1, no report. Burt and Son's Menking 1, no report. Fitzsimmons et al's Huber 1, dr 2040 ft. Mrs. Alice Garrett's 1, no report. Linderman Bros.' Frampton 2, lcn. Madron Oil Co. (Finnell and Elam) Robinson 1, reamed to 1544 ft and abn in Carrizo sand on account of too heavy gas pressure, skidded derrick over and will start new hole shortly; Borer 1, dr about 1650 ft.

GUADALUPE COUNTY—Abercrombie et al's Dix 4, lcn; Dix 5, lcn; Dix 6, lcn. Clemens-Trinity Drillers' Rand Miller B-1, waiting on cement around 2600 ft; White 1, dk; Harbot 1, dr 2420 ft in Buda. J. C. Dorey et al's Apling 1, sd at 103 ft. Gulf's McKean-Dix 5, prod. 1100 bbls at 2618 ft; McKean-Dix 6, being put on pump at 2594 ft; McKean-Dix 7, being placed on pump at 2590 ft; McKean-Dix 8, se casing at 2594 ft. Humble's Yates Wilson 1, dk; Yates Wilson 3, dk; Denman 1-B, dr; D. D. Baker 1, dk; Baker 4, dr; Sallie Wilson 5, being completed, casing set at 2633 ft; Denman 10-A, dr; Denman 11-A, ru. Jake Jarmon's Fee 1, being completed around 2550 ft, casing reset and cemented. Magnolia's Echols 3, dr; Roamel 2, dk; Walker 1, dr; T. Dix 7, spud in; M. E. Roamel 1, to spud in. Simms Oil Co.'s Manford 3, no report. Stroube and Stroube's Rand Miller 2, lcn; Rand Miller 3, lcn; Rand Miller 4, lcn. The Texas Co.'s S. M. Roamel 1, abn at 2954 ft; Roamel 3, no report; Lemmy Anderson 3, dk; Dallas Wilson 2, dk; Posey Baker 2, prod 1000 bbls at 2606 ft; Henry Willie 4, dr; Knoblock 4-B, dk; Knoblock 4-A, dk; Knoblock 5-B, dk; Knoblock 5-A, dk; Knoblock 3-A, dk. Turman et al's Talley 1, (St. Charles), dr 2425 ft; Dowdy Strip 2, (Guadalupe County), sd 1200 ft. United North and South Oil Co.'s P. Roamel 3, coring around 2630 ft.

JIM HOGG COUNTY — Alworth-Stevens-Hild's Garza 1, dr. L. M. Holden's Jones 1, dr. O. W. Killam's Martinez 2, dr. Magnolia's Martinez 4, dr; Martinez 5, dr; Weil 1, Sec. 85, plugged at 3530 ft. George Marshall's Holbein 4, dr; Holbein 5, dr. Moore and Milam Drilling Co.'s Guerra 1, dr. The Texas Co.'s Banders 1, dr.

KARNES COUNTY—Burnett's 1, dr. Hurador Pet. Co.'s Porter 1, ru new rotary, hole at 3500 ft. Texas Co.'s Butler 1, dr.

KERR COUNTY—Machs et al's Love 1, dr.

KENDALL COUNTY—Borget et al's Willie Haag 1, reamed out hole to set casing, hole around 650 ft. Dixon etal's Behr 1, reported sd around 100 ft. Sterling et al's Wormser 1, being placed on pump at 925 ft, reported to have bailed out large amount of heavy oil. Seaboard Oil Co.'s Asky 1, moving on.

KINNEY COUNTY—Blume et al's Herbst 2, prep to spud in. Mardon Oil Co.'s Clamp 2, dr about 300 ft.

KIMBLE COUNTY—Bryant et al's Lam-

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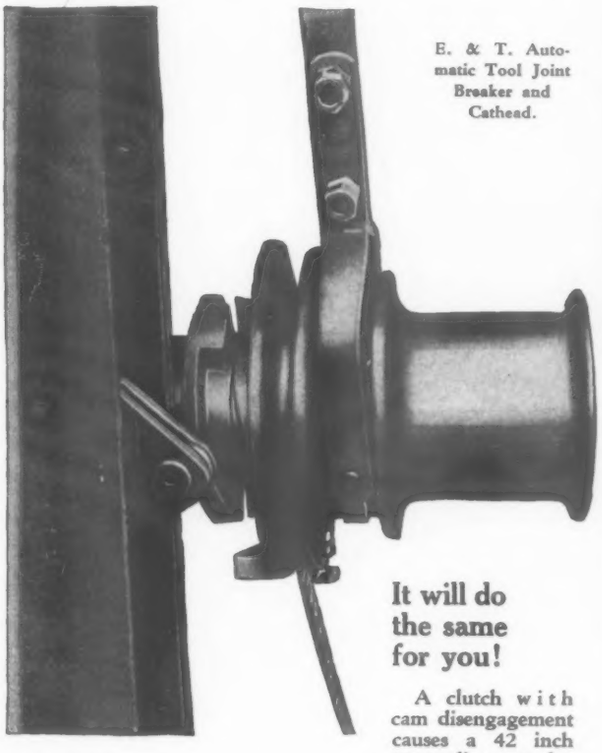

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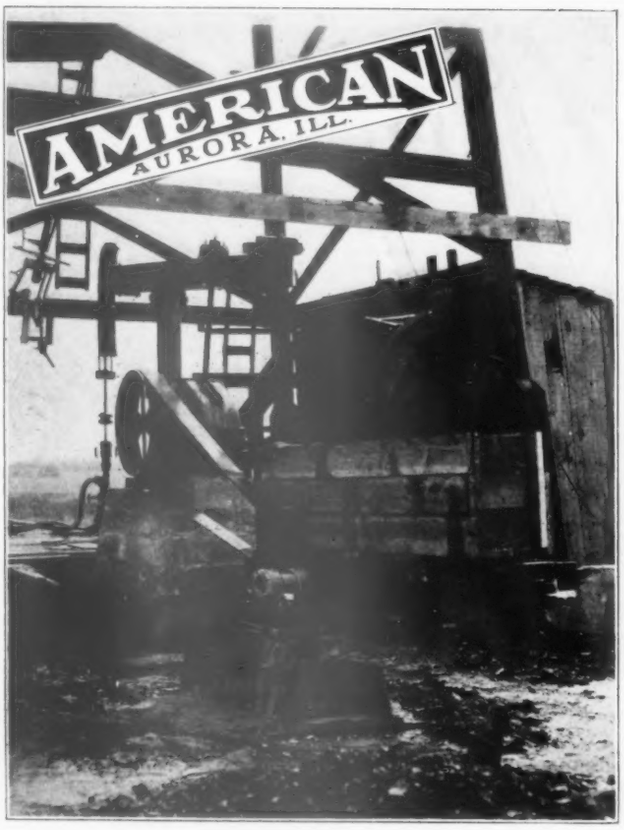


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bert 1, sd about 800 ft. Lambert et al's Cannon 1, no report.

LIVE OAK COUNTY—Catlett and O'Neill's Smith 1, sd about 4500 ft. Simmons Oil Co.'s Croquat 1, dr about 4000 ft. Houston Oil Co.'s Dunning 2, dr.

MAVERICK COUNTY—Rycade Oil Corp.'s Chitim 3, sd for orders at 6655 ft Chittim 6, dr; Sullivan 5, dr 740 ft.

MEDINA COUNTY—Donaldson Oil Co.'s Adams 2, to spud in. Calico Pet. Co.'s Crawford 1, dr. Mid-Kansas O&G Co.'s Newton 1, sd at 1990 ft. Pan American Oil Co.'s Harrison 1, sd. Pat Armstrong's Crawford 1, prep to spud in. Sweitzer's Zerr 1, fishing at 3710 ft. Pupe Oil Co.'s Fohn 1, prep to set casing.

McMULLEN COUNTY—Cowboy Oil Co.'s Skinner 1, dr around 2800 ft. Hilton-Phillips et al's Durden 1, lcn. Southern Crude Co.'s Baker 1, dr at 2214 ft.

NUECES COUNTY — Allied Gas Co.'s Chapman 1, dr around 2250 ft. Graham, Wallace, Yeagley and Patton's Wallace 1, dr 3280 ft. Grimm et al's Roberts 1, dr below 2600 ft.

REFUGIO COUNTY — Blanco Creek Oil Co.'s Damon 1, (Bonnie View Rancho), Sec. 16, dr around 225 ft. Corona Oil Co.'s Zarski 1, dr 920 ft. Dixon et al's 1, Sec. 37, (Bonnie View Ranch) dr 2370 ft. Hamil Drilling Co.'s Cable 1, dr around 900 ft. Herman Heep Oil Co.'s Vancel 1, set casing at 3665 ft. Heflin et al's Heard 1, dr around 1340 ft. Edwin M. Jones' A. Leissering 1, prod. 350 bbls at 3675 ft, casing set at 3673 ft; Heard 1-A, dr at 2730 ft; Mitchell 1-A, lcn; Jetter 1,set casing at 3707 ft. Houston Gulf Gas Co.'s Lambert 2, dr 3114 ft; Morgan Vance 2, reworking to complete as oil well, made gasser at 3692 ft; Morgan Vance 3, spud in. Houston Oil Co.'s Rooke Hotel 1, flowed 1000 bbls fluid, about 50 per cent oil at 3691 ft, attempting to shut off flow of water by plugging back, casing set at 3682 ft; Rooke 1, Blk 48, rebuilding derrick pulled in when pulling liner, casing set at 3683 ft; Carlysle 1, prod 700 bbls through 5/6-inch choke at 3695-3717 ft, casing set at 3695 ft; Shelton 1, dr 2240 ft; Dorsey 1, blk 78, setting casing at 3676 ft; Rooke 14, dr about 920 ft; Tom Heard 1, blk 16, dr 4215 ft; Doughty 1, dr about 1680 ft; Fannie Heard 9, dr 1640 ft. Independent O&G Co.'s J. B. F. Heard 1-B, swabbing at 3660 ft; West 3, dr 551 ft in gumbo; Shelly 1, tested salt water, pulling liner to plug back several feet, casing set at 5481 ft; Mercy Academy 1, dr 2590 ft in shale and lime; Helen Reilly 1, set casing at 3682 ft; Claude Heard 3, dr 1981 ft; Heard 1-C, dr 3316 ft in gumbo; J. B. F. Heard 2-B, shut in at 3680 ft. Luling O&G Co.'s Fannie Heard 1, dr at 2740 ft. Mission Drilling Co.'s Moss 1, blk 110, dr at 4315 ft; O'Brien 1, dr 1820 ft. Morgan Oil Corp.'s Tom Heard 1, blk 2, set 8¼-inch casing at 5471 ft; Fox 1, blk 70, dr below 2200 ft; Powers 1, dr about 3150 ft; 1, blk 32, showed salt water at 3682 ft, casing set at 3680 ft, may drill deeper; City 5, prep to set casing at 3678 ft; Carlysle 1, dr about 5240 ft; Rooke 1, dr about 5365 ft. Morgan and Morgan's Rooke 1, dr at 5210 ft. Oigfuer Oil Co.'s Ryalls 3, dr. Pearson Properties' Ryalls 1, dr at 4687 ft; Shelton 1, dr at 5665 ft. Price et al's Mission 1, dr around 2500 ft. Refugio Oil Corp.'s Wheeler Heirs 1, blk 50, being completed at 3667-86 ft. Rutherford-Traylor Oil Co.'s Cable 1, ru. Saxet Oil Co.'s Cable 2, blk 19, dk; Fox 1, blk 95, lcn; Ryalls 2, lcn; Powers 1, blk 3, lcn; Serafino 1, blk 5, lcn; Holmes Heard 3, no report. Sun Oil Co.'s Buckley 3, blk 2, casing set at 3670 ft, pulled screen to reset. The Texas Co.'s Shelton 1, drilling around 5550 ft; Holmes Heard 3, dr. Union Producing Co.'s O'Brien 2, casing being pulled to abn test about 5555 ft; Shelton 1, reported to be still running wild at 5550 ft, making oil, sand, gas and water; 1, block 100, prep to spud; Moss 1, dr; Tom Heard 1, blk 3, dr; J. B. F. Heard 2, prod about 500 bbls at 3668 ft, casing set at 3658 ft; Rose Lambert 1-A, 8¼-inch casing set at 5245 ft, recementing at connection with 12½-inch casing; O'Bruen 3, ru; Powers 3, ru.

SAN PATRICIO COUNTY—George Pickett's Baldwin 1, prep to spud. La Ferria Oil and Gas Co.'s Smith 1, waiting on cement at 2246 ft.

STARR COUNTY — French et al's Reilly Allen 1, dr. Mrs. J. L. Smith's Welch 1, dr. The Texas Co.'s Guerra 1-A, dr 1300 ft. Milam Drilling Co.'s Allen 5, dr.

UVALDE COUNTY — Phantom Oil Co.'s Claudt 1, dr. Weldon and Welch's Benson 1, making test around 770 ft.

VICTORIA COUNTY — Humble's Welder 3-A, resumed drilling around 5900 ft.

VAL VERDE COUNTY — Blume et al's Yost 1, dr. Independent Operator's Whitehead 1, shut down at 4860 ft. O. O. Owens' Mille 1, sd at 5727 ft. Phamtom Oil Co.'s Ingram 1, cemented casing at 2548 ft. Transcontinental Oil Co.'s Good 1, dr. Valvert Oil Co.'s Bassett 1, sd around 4000 ft.

WEBB COUNTY—Houston Oil Co.'s Benavides 2-C, lcn; Benavides 2-D, dr; Perez 1, dr. O. W. Killam's 17, dr; Bruni 18, set cas at 2315 ft; Bruni 1, blk 33, plugged at 2040 ft. Magnolia's Brennan Benavides 4, plugged at 3510 ft; Brennan Benavides 1, casing set at 2745 ft, bottom of hole at 2751 ft. W. E. May's Valls 1, casing set at 2279 ft, testing at 2300 ft. George Marshall's Webster 2, Sec. 684, resumed drilling, hole now at 2122 ft. W. R. Shankle's Webster 2, dr.

WILSON COUNTY—Empire's Phil Shook 1, spud in.

WILLIAMSON COUNTY—Beatty's Bland 1, sd at 1140 ft. Chapman et al's Fuchs 1, casing set at 1772 ft, plug drilled out and now being bailed; McConnell 1, dk; Abbott 1, dk. Edwards and Associated's Abbott 1, dr. Harlem et al's Styles 1, to spud in. Lightfoot et al's Fletcher 1, drilling about 1400 ft. C. P. Link's Simmons 1, lcn. Marts et al's Abbott 1, to spud in. Peterman's Abbott 1, dk; Abbott 2, dk. Simms Oil Co.'s Laurence 1, dr about 1620 ft. Scoyners et al's Abbott 1, sd about 1650 ft. Powell and Associated's Meager 1, sd about 1500 ft. Tomlinson et al's Martin 1, dk; Martin 2, dk. Wilson et al's Laurence 1, to spud in. Westheimer et al's Abbott 1, dk.

ZAPATA COUNTY—Allied Gas Co.'s 1, dr. Blair and Claggett's Trevino 3, Sec. 66, lcn. Blankenship et al's Garza 2, dr 1000 ft; Montemayor 2, dr at 500 ft. Duval Oil Co.'s 1, dr. Dr. Edgington's Trevino 1, Sec. 412, casing set at 1238 ft, bottom of hole 1251 ft. O. W. Killam's Cuellar 20, coring around 1534 ft; Cuellar 12, prod. 600 bbls at 1542 ft, casing set at 1538 ft. Livingston and Twiss' Trevino 1, blk 7, sec 66, prep to spud in. Reese and Shankle's Guiterrez 1, (Associated Lease) spud in. John Pappas' Cuellar 2, Porcion 24, flowed gas and salt water, casing set at 1675 ft.

ZAVALLA COUNTY—Pryor et al's Campbell 1, dr below 630 ft. Southern Crude Oil Co.'s Washer 1, dr at 2740 ft. Wiegand Bros.' Gates 1, dr below 1200 ft. Texas Gas Fuel Co.'s West 4, heavy showing of gas at 2445 ft; Matthews 1, dr 1230 ft. Tritex Oil Co.'s Childress 2, dr.

## ARKANSAS

### Completions

| Company, Well and Location | Initial Production Bbls. | Depth |
|---|---|---|
| OUACHITA COUNTY— | | |
| Louisiana O. R. Corp., Tucker 1, 15-15-19 | 12 | 2260 |
| UNION COUNTY— | | |
| E. G. Bradham, Craig 1, 6-18-15.. | 6 | 2200 |

ASHLEY COUNTY—Ark. Fuel Oil Co.'s Crossett Lbr. Co. 1, 1-19-7, dr 3570 ft.

COLUMBIA COUNTY — L. E. Parker's Franks 1, 25-19-22, sd 2831 ft. Williams et al's Fullenwider 1, 12-17-22, rigged up wo.

CLEVELAND COUNTY — Donnell et al's Fee 1, 33-11-9w, sd 60 ft.

CLEBURNE COUNTY—Cosden Oil Co.'s Donithan Lbr. Co. 1, 19-9-10, dr sandy lime 2150 ft.

DREW COUNTY—McClintock & Goedke's Ogle 1, 33-13-3, sd in new hole 1810 ft to old hole 2530 ft.

FAULKNER COUNTY—Gold Creek O&G Co.'s Stermer 1, 17-4-13, ta 3872 ft; Stermer 2, 17-4-13, rigged up ready to spud, dr water well.

FRANKLIN COUNTY — Ozark Nat. Gas Corp.'s McElroy 1, 15-8-27, arr plug back, td 3100 ft.

GARLAND COUNTY—H. H. Given's Garrett 1, 1-13-19w, dr 3406 ft.

GRANT COUNTY—Jones & Watkins' Mesh 1, 5-4-11, ta 1400 ft.

JOHNSON COUNTY—Ark. La. Pipe Line Co.'s Patterson 1, 14-10-14, set 13⅜-inch cas 1500 ft, set 10-inch cas 2480 ft. Blackwell O&G

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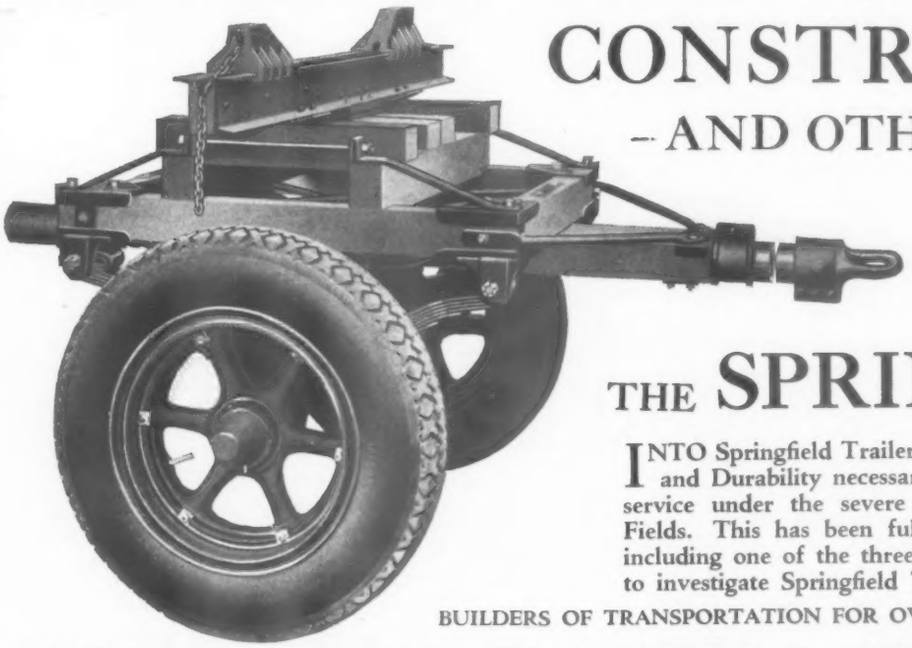

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Co.'s Wyver 1, 21-8-25, jarring out 6-inch cas at 2100 ft to test gas sand at 1900 ft, td 5600 ft.

LOGAN COUNTY—M. W. Greesom's Perk 1, 21-8-24, sd 1309 ft.

LAWRENCE COUNTY — Marguerite Dev. Co.'s Broadway 1, 31-17-1, sd 45 ft.

LITTLE RIVER COUNTY—Grote et al's Allen 1, 31-12-31, ta 2941 ft. C. F. McDonald's Black 1, 12-13-28, sd 1965 ft. Buck Oil Co.'s Taafe 1, 23-12-32, dr 2330 ft.

MADISON COUNTY—Phillips et al's Skinner 1, 11-14-28, arr resume dr, td 1461 ft.

NEVADA COUNTY — Ray Davis et al's Henry et al 1, 10-12-20, rigged up wo.

OUACHITA COUNTY—Copenhaver et al's Warnick 1, 2-15-17, ta 2190 ft. Anderson & Skinner's Buck 1, 7-15-17, fsh ds 2727 ft. Artex Oil Co.'s Smith 1, 31-15-17, ta 3188 ft. McDonald Bros.' Wilson 2, 25-15-18, sp set 10-inch cas 54 ft A. P. Smith et al's Reynolds 1, 21-14-17, set 6-inch cas 1711 ft, dr plug setting liner, td 1747 ft. Louisiana O. & R. Corp.'s Tucker 1, 15-15-19, set 5-3/16-inch cas 2186 ft, pumping 12 bbls oil, 500 bbls sw, td 2260 ft. Magnolia Pet. Co.'s Grayson 1, set 8⅛-inch cas 1466 ft, wosr, td 1478 ft; Grayson 2, 21-15-19, sp set 15½-inch cas 248 ft, dr 700 ft.

PIKE COUNTY—Theo. Davis, Tr.'s, Ruth Wilson 1, 25-5s-26w, sd 718 ft.

POPE COUNTY—Cosden Oil Co.'s Mo. Pac. R. R. 1, 13-9-19w, set 10-inch cas 2508 ft, dr 2640 ft. Ark. La. Pipe Line Co.'s Crutchfield 1, 14-9-21, dr 396 ft.

PRAIRIE COUNTY—Transcontinental Oil Co.'s Novack 1, 36-2-6, set 8¼-inch cas 2058 ft, sr td 2931 ft.

SCOTT COUNTY—Mansfield Gas Co.'s Norris 1, 6-4n-30w, set 10-inch cas 1447 ft.

SEBASTIAN COUNTY—M. W. Greason's Spears 1, 9-7-29w, lcn. Lavaca O&G Co.'s Cason 3, 21-8-30, dk. J. O. Ingram 7, 22-8-30, dr 2700 ft, no recent report. A. C. Williams, Jr.'s, Patterson 1, 27-8-30, lcn.

ST. FRANCIS COUNTY—Brownlee Drilling Co.'s Whitted 1, 28-4-1, sd 300 ft.

UNION COUNTY — Frank Staples' Ainsworth 1, 8-19-16, ta 2174 ft. Lion O. R. Co.'s McDuffie 1, 32-19-16, ta 4506 ft. O. W. Estes' Telford 1, 35-17-15, tested sw 2509-14 ft, dr 2555 ft; Felsenthal 1, 2-18-15, sd wo 2191 ft. Modisette Drilling Co.'s Federal Pet. Co. et al 1, 14-18-14, tested 7 fourbles oil and mud 2256 ft, set 6⅝-inch cas 2234 ft. J. H. Johnson Drilling Co.'s Tate 1, 14-18-14, moving in rig. E. G. Bradham's Craig 1, 6-18-15, set 6-inch cas 2080 ft, pumping 6 bbls oil 30 bbls sw, td 2200 ft. H. L. Hunt's Pratt 6, 7-18-15, sand pumping, td 2214 ft. Al-Cal Oil Corp.'s Haney 1, 1-17-16, tested sw 2593 ft, sd repr rig, td 2718 ft. Malloy & Co.'s Robertson 3, 6-18-15, lcn. Goodwin 4, 36-17-16, set 6⅝-inch cas 2186 ft; Murphy 1, 1-18-16, dk. Wisinger & Ball's Rodgers 1, 31-17-15, set 6⅝-inch cas 2170 ft, bailing cas, td 2170 ft. Lion O. R. Co.'s Ballard 1, dr hard sandy lime and red shale 2930 ft. Johnson & Gummer's Cargile 1, 4-18-13, co td 3341 ft. Federal Pet. Co. et al's Tillman 1, 9-18-13, lcn. Marine Oil Co.'s Winn Est. B-2, 10-18-13, set 12-inch cas 273 ft, dr gummy shale 2010 ft. Simms Oil Co.'s Simmons 1, 10-18-13, dr lime 2394 ft. Simmons 2, 10-18-13, lcn. E. L. Chapman's School District 1, 9-18-13, lcn.

WASHINGTON COUNTY— Lincoln Lease Holding Co.'s Townsite 1, 30-15-32, sd 1500 ft. C. H. Willoughby's Jones 1, 34-16-30, trying kill water flow 2150 ft. O'Hara & Shetterley's Boyd 1, 12-16-32, ta 850 ft. Delbert Graves' Cunningham 1, 14-15-32, sd in gray sand 602 ft.

WHITE COUNTY—Letona Synd.'s Letona 1, 35-9-8, set 5-3/16-inch cas 3500 ft, sd 3650 ft.

VAN BUREN COUNTY—J. S. Martin's Scanland 1, 5-9-13, sd 50 ft.

YELL COUNTY—T. Luckett's Balcon 1, 36-7n-21w, sd 3550 ft.

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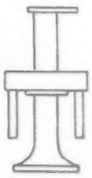
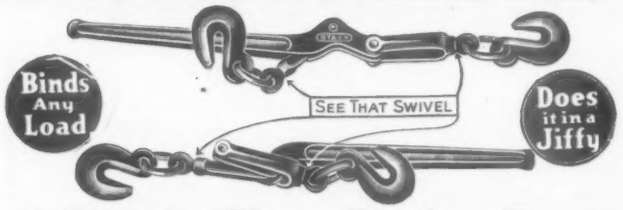


"BOOMERS"

**Stacy Swivel Load Binders**




**A Handy Time-Saving Tool**

Stacy Swivel Load Binders have many practical Oil Field uses. They make hauling safe and save time and work by binding any load quickly, easily, securely. No load is too big or too heavy for this indispensable tool. Photograph below shows how the Stacy Binder holds a pipe welding clamp firm. Made in 5 sizes, weighing from 2 lbs. to 14 lbs. for each single tool, not for a pair as commonly quoted, sold and used.

*Used in Every Oil Field in the World*

Just ask your jobber or export agent for Stacy Load Binders in the size you want. He'll do the rest. I also sell chains. Any weight, size or length with hooks or as desired.

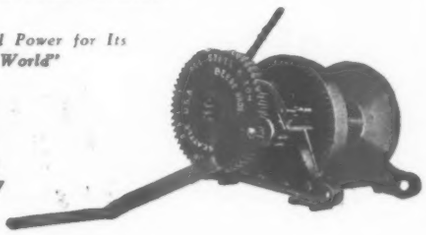
**EUGENE C. STACY, Manufacturer, Tiffin, Ohio., U.S.A.**

**ALL STEEL HAND HOIST** TRADE MARK

SEATTLE, U.S.A.

*"The Strongest Geared Power for Its Weight in the World"*

**5** TONS Capacity



Weight 110 lbs

Capacity FIVE TON STRAIGHT LINE

Size 16x17x13" High

Two Speeds 4 to 1 24 to 1

POSITIVE INTERNAL BRAKE

Construction Eight Pieces Electrical Steel Without Keys or Setscrews

*A Friend in Need to Every Oilman*

The great utility, power and dependability of the Beebe All Steel Hand Hoist is bringing more and more producers to use it for emergency jobs. Does the same heavy hoisting and pulling as much more expensive equipment thus saving time and money. Quick set-up and safe, positive control.

**PRICE $80**

Steel Tail Hold Yoke $4 Extra. Truck Attachment Plate, $10 Extra

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**Steel as tough as the birds who use it!**

Tough is the word—able to endure strain—hardship and severe labor—always to emerge the victors.

What more could be said of the men responsible for the production of oil and gas? But what greater tribute can be paid to ASCO Well Bit Tool Steel—than to compare its qualities with the stamina of these men.

Just as they are acquainted with the hard knocks of life so is ASCO Well Bit Tool Steel acquainted with the seemingly unpenetrable surface of the hardest rock formations.

ASCO Well Bit Tool Steel is made under the careful supervision of experienced metallurgists, to resist abrasion in the toughest of rock formations.

THE ANDREWS STEEL CO. NEWPORT ASCO KENTUCKY

# M-S-A *Combination* Hose Mask

***The Only Fresh Air Mask Officially Approved by both the United States Bureau of Mines and American Gas Association***

*Bears U. S. Bureau of Mines Approval No. 1901*

**Ball Bearing Blower, operated by outside man, furnishes wearer uninterrupted stream of Fresh Air under most vigorous use.**

*Demonstration on Request*

**Extensively used for protecting men in Oil Tanks, Tank Cars, Shipholds, Derrick Cellars, etc., or in general where High Concentrations of Gas or Oxygen Deficient Atmospheres are likely to be encountered.**

**Ask for Bulletin No. 170**

*Mine Safety Appliances Co.*

*Braddock, Thomas and Meade Sts., Pittsburgh, Pa.*

**"Everything for Mine and Industrial Safety"**

# Yellow Strand Rotary Drilling Lines in Every Field

One Big Idea moves the operators in all fields to repeatedly specify Yellow Strand Rotary Drilling Lines. They get more service for their money from this unusually elastic, non-crushing and dependable rope, of *uniform* strength. The wire is drawn from pure Swedish stock.

Conveniently located distributors carry stocks especially designed for the requirements of nearby fields. Ask for catalog 40.

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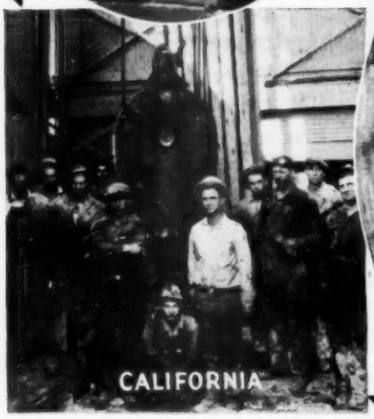
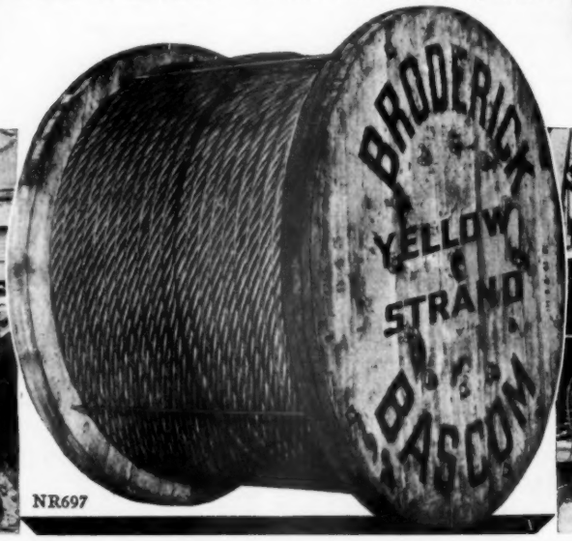


# NEW EQUIPMENT, CATALOGS, BULLETINS, BOOKS

## Automatic Cathead

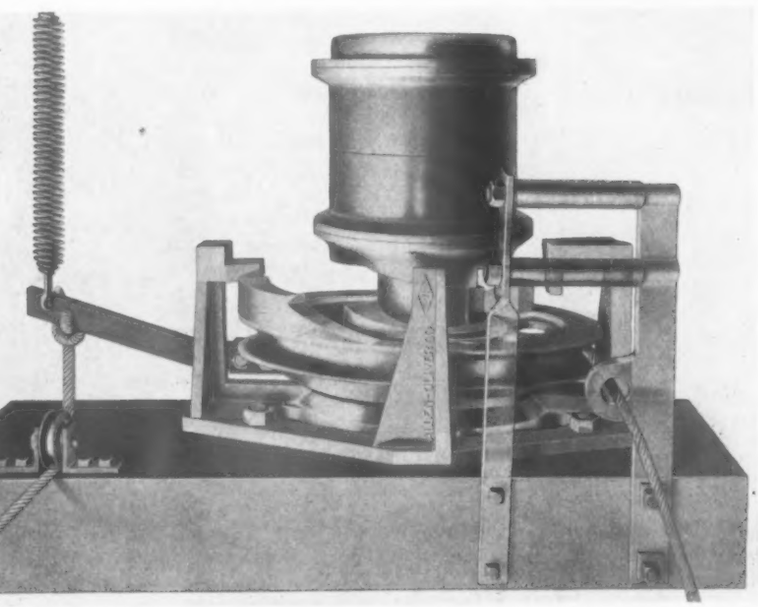
**ALLEN-OLIVER COMPANY, Inc.**

The A1-N-O1 automatic cathead, announced by Allen-Oliver, Inc., Los Angeles, consists of only three major parts, the spool, sheave and supporting frame, and in operation is similar to the low clutch on the draw works making the full power of the draw works available when breaking out the toughest joints.

The spool is keyed to the draw works line shaft . The drive sheave, which is bushed with a high grade bronze bushing is rotatably mounted on the spool. The sheave is provided with clutch jaws which mate with jaws on the spool. When it is desired to make a pull on the tong line the driller pulls on the rope connected to the shifting lever, and the sheave slides outwardly a distance of approximately one inch, engaging the clutch jaws on the nigger head. The sheaves makes one complete revolution giving a 48-inch stroke before it is automatically disengaged by means of the two kick-out lugs on the sheave which contact the overhanging arms of the main frame. A coil spring, which is attached to the shifter arm and derrick leg, is to prevent the clutch from becoming accidentally engaged. As soon as the clutch is disengaged the counter-balanced sheave rolls into a neutral position, ready for the next operation. The wide bronze bearing in the sheave is lubricated by grease from a large reservoir. This reservoir is fed by means of the Alemite system.

The shifting mechanism is composed of a piece of Manila rope, a slight pull of which engages the clutch to prevent kick-back. The rope guard is merely a piece of boiler plate bolted to the overhanging arms of the main frame, is to prevent the catline from becoming entangled in the jaws.

Another feature is the renewable wearing face on the nigger head. A pair of reversible liners, heat-treated and hardened for long wear, are keyed to the main spool casting. If the innermost half should become line cut, the operator reverses the position of the two, or substitutes a new piece to eliminate the necessity of removing the cathead to the welding shop for building up with a torch.



*Allen-Oliver Automatic Cathead*

## Pump Mounting

**RESISTCOR ENGINEERING CORPORATION**

Of new design and manufacture is a specially made pump mounting on a McCormick-Deering Model 20 tractor for use in core drilling in field exploration work. This mounting has been devised by Resistcor Engineering Corporation of Tulsa.

The special mounting rests on the front and rear axles of the tractor which is equipped with L. H. Trackson full crawlers. The unit is thus made evenly balanced and can also be equipped to run on wheels or with D. H. Trackson crawlers. The pump is driven by power from the power take-off of the tractor by means of a short chain and sprocket through a transmission mounted over the left axle and attached to the frame mounting. This gives variation of three speeds forward and one reverse on the draw-bar works of the tractor.

*Resistcor Pumping Unit*

This unit can be used on pipe lines for testing purposes. The one illustrated herewith is being used by geological departments of oil companies for power for core drilling and also acts as power to operate the circulating mud and clear water pump in this kind of exploration work.

The gasoline tank is removed from its natural position and mounted on the left side of the motor to minimize fire hazards. It is sturdily built throughout of best materials and has been thoroughly proven in extensive field work.

More detailed information may be obtained by communicating with the manufacturers direct.

---

De Laval Steam Turbine Company, Trenton, New Jersey, has recently received contract for furnishing four new oil tankers with De Laval geared steam turbines. Two are being built by Federal Shipbuilding & Dry Dock Company for the Standard Shipping Company of New York and two by Bethlehem Shipbuilding Corporation for Sinclair Navigation Company.

The two Standard Oil Company tankers, which are rated at 18,000 tons each, measure 444 feet long, 74 feet beam, and 40 feet and six inches depth and will draw 28 feet. They are to be driven at 11 miles an hour by De Laval compound steam turbines with double reduction gears, rated at 4000 shaft horsepower and capable of developing 4400 horsepower. The two Sinclair tankers will measure 331 feet long, 57 feet beam, 32 depth and 24 feet draft, and will be rated at 8400 tons. These also are equipped with compound turbines with double reduction gears built by De Laval Steam Turbine Company.

Steam will be supplied at 350 pounds per square inch gage from Babcock & Wilcox boilers. The designed speed is 13 miles per hour.

## Roller Bearings

American Roller Bearing Company of Pittsburgh announces publication of an attractive 76-page catalog, which is off the press and ready for distribution to the manufacturers of heavy duty machinery and equipment. It covers the company's line of bearings made only for heavy duty service, as for service in the heavier types of industrial machinery and in heavy load-moving equipment of the oil fields. American bearings are manufactured in three types: "Medium duty," "heavy duty" and "super heavy duty," with a wide range of sizes offered, and the catalog is fully illustrated with typical products in which these bearings are used. Drawings are used in the catalog to show various methods of installation in regard to end plate construction, doweling of inner races and control of thrust. A copy of this catalog will be mailed upon request to the company at Pittsburgh.

---

### SIVYER STEEL BULLETINS

Joining of forces of the Sivyer Steel Casting Company, Milwaukee, and the Nugent Steel Casting Company, Chicago, is announced in Bulletin No. 125, published March 1 by the latter company, giving the name of the combined company as Sivyer Steel Casting Company, of Milwaukee and Chicago. The new company now offers the combined plants, including research and services to buyers of small, variable section steel and alloy castings.

Bulletin No. 125, an elaborate publication 12 x 17½ inches, illustrated in two colors, giving the general line-up following the merging of the two forces, may be obtained by writing the Chicago or Milwaukee headquarters.

---

The Du-Gas Fire Extinguisher Corporation, 11 West 42nd Street, New York City, has recently published two folders which describe, with illustrations, the Du-Gas non-liquid fire extinguishers, which is a fire fighting engine using a dry chemical. The engine is of 10-gallon capacity, with dimensions 21x28½x51 inches high.

GEO. W. McLEAN, JR.

Geo. W. MacLean, Jr., has been appointed sales representative in Oklahoma for Fairbanks Company, manufacturers of Fairbanks valves and Dart unions. Mr. MacLean will have headquarters in Tulsa and work through the Bovaird Supply Company, exclusive distributors in that state. He formerly was oil country sales manager for Ajax Rope Company and prior to that was Tulsa store manager for Murray Tool & Supply Company.

## Haynes Stellite

Haynes Stellite Company has a new publication, "Properties of Haynes Stellite," a loose-leaf booklet which has been completely revised, brought up to date and which includes additional information which did not appear in previous editions. It covers a general description of the Haynes stellite alloys, an explanation of red hardness, the uses, physical properties, chemical properties and structure of these alloys. A copy will be furnished upon request to the company at Kokoma, Indiana, or any branch office.

## Line Pipe Bulletin

Naylor Pipe Company, 1230 East 92nd Street, Chicago, is distributing a new 48-page, illustrated booklet covering Naylor line pipe, the new light weight pipe made of Toncan iron to resist rust and corrosion.

The light weight feature of the pipe is illustrated by field pictures, showing two men carrying a 40-foot joint of six-inch pipe and three men carrying three 20-foot lengths of six-inch couplings are illustrated with a section of welded joint beveled end pipe, a Victaulic groved end pipe and a Dresser No. 38 bolted joint coupling. Tests showing how the pipe can be bent cold are shown with descriptions and illustrations.

A table showing analysis of 12-inch pipe line costs is carried, a carloading schedule is given, and a page is devoted to list prices.

## Motor Bulletin

Allis-Chalmers Manufacturing Company, Wilwaukee, Wisconsin, has issued a new bulletin, No. 1141-A, entitled "Steel Frame Oil Well Motors," which is devoted to describing this line of the company's equipment with detailed illustrations. Featured in this bulletin is the Allis-Chalmers motor designed to meet the oil well pumping problem. The low loss laminated steel rotor core is fully described and considerable space is devoted to the company's control for oil well motors. This bulletin is available upon request to the company's headquarters in Milwaukee.

*Let us give you all the facts and data*

We have found that for Rotary Drilling, Casing, Sucker Rod and Tubing Lines, Tru-Lay *Preformed* Wire Rope is a marked success. Our men report, in some cases, over 200% increased service with Tru-Lay.

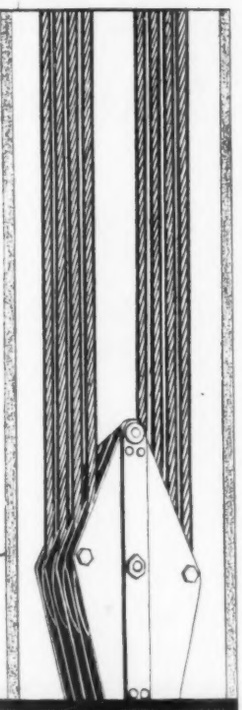
Let us show you how we can cut your wire rope costs. We have the facts and figures.

**Tru-Lay Preformed Wire Rope**

*Distributed by:*

**MID-CONTINENT SUPPLY CO.**

*Complete stocks at* Houston, Texas; Shreveport, La.; Monroe, La.; Lake Charles, La.; El Dorado, Ark.



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PARKERSBURG MACHINE CO. PARMACO PARKERSBURG, W. VA. U.S.A.

*The House of Courteous Service*

**Heeter's Packers and Swabs**

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**Heeter's Improved Patent Swabs, Corrugated Friction Sockets, Wire Line Pumping Outfits, Sand Pumps and other Gas and Oil Well Materials.**

**May we send you our catalog showing complete line?**

**C. M. Heeter, Sons & Co. (Inc.)**
**Main Office and Works, Butler, Pa.**

# Squeaks from the Bull Wheel

"What did you do when you found out your husband was leading a double life?"

"Oh, I redoubled."

---

"What kind of flowers are they?"

"Poppies."

"I mean the name, not the sex."

---

Irene Thomas, pretty typist,
Really made a hit
With her new boss, Dave A. Mayer,
But she had to quit
When he noticed on each letter,
She had signed—DAM-IT.

*—Pure Oil News.*

---

He: "What would I have to give you for just one little kiss?"

She: "Chloroform."

---

The driller was busy sawing on the steak he had ordered—and a difficult time he was having.

"Is it tough?" queried the waiter solicitous.

The driller was exhausted. He turned to the waiter with defeat in his eyes and said: "When I order beef and get horse, I don't care. But next time, take the harness off before you start serving."

---

Whatever else may happen,
Now that the country's dry
The sailor he will have his port,
The farmer have his rye,
The cotton still has got its gin,
The seacoast has its bar,
And each of us will have a bier,
No matter who we are.

---

Interviewer—Are you one of those girls who watch the clock?

Applicant (with dignity)—No, sir; I have a wrist watch.

---

"And now," said the teacher, "will someone please give us a sentence using the word 'candor.'"

"Please 'm, said the bright little boy in the front seat, "my papa had a pretty stenographer, but after ma saw her he candor."

---

Teacher, may I leave the room?

No, you stay here like a good boy and fill up the inkwells.

---

I hear you had an addition to your family, Mrs. Cat; was it a boy or a girl?

Oh, just six of one and half dozen of the other.

---

"Zoup, sir? Zoup? Zoup?"

"I don't know what you're talking about."

"You know what hash is? Well, zoup is looser."

**Positively**

He was in college and needless to say he was in financial straits. So he wrote home to his father, the usual type of trusting farmer, and told him of a wonderful new system by which they were now teaching dogs to talk. He suggested that for $1000 paid in monthly installments he could have his dog Rover trained in the new art, and that eventually he could make many times the original investment by showing Rover around the county during summer vacation. So each month Dad sent the $100 and lived in a state of expectancy, mean-while receiving glowing accounts of Rover's progress. But came a day of reckoning, the term was ended and sonny must journey homeward. Dad met him at the station with the buckboard and was so impressed with his new clothes and high hatted mannerisms that he forgot about Rover until they were well on their way homeward. Suddenly, however, he turned to his boy.

"Where is Rover, son?" he asked.

"Poor Dad," said Eric with tears in his voice, "after all the money and trouble I hate to tell you, but Rover is dead."

"Dead?"

"Yes, poor dog! He was killed this morning on the way. You see he had gained almost as much proficiency in speaking as many children and suddenly when we were on our way home today he turned to me and said, 'And so we're going back to the farm?' 'Yes,' I replied. 'Tell me,' said Rover, 'is your old man still sweet on the hired girl and that neighbor lady next door?' And I was so incensed at his insult to you that I struck him. He immediately sprang out the window and as the train was going sixty miles an hour he was killed instantly."

The old man didn't reply and for a time they rode along in silence. Finally he turned to the boy again.

"Son," he asked quaveringly, "do you reckon that dog is surely dead?"

*—The Office Cat.*

---

Salesman: "You'll like this plane."

Lindbergh: "I think I'll take it."

Salesman: "Shall I send the bill to you today?"

Lindbergh: "No, I think you'd better send the bill to Morrow."

---

Mrs. McPherson (just at meal time)—"Sandy, we have guests at the door."

Sandy—"Grab a toothpick, quick!"

---

Two men were walking along a railroad, one being very deaf. A train was approaching, and as it rounded the curve, the whistle gave one of those ear splitting shrieks which seemed to reach heaven. "That is the first robin I have heard this spring," said the deaf one.

**"Favorite of the Oil Fields"**

**UNRIVALLED for SERVICE**

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Newark, N. J.

CAMEL'S HAIR, COTTON and LINEN PRODUCTS

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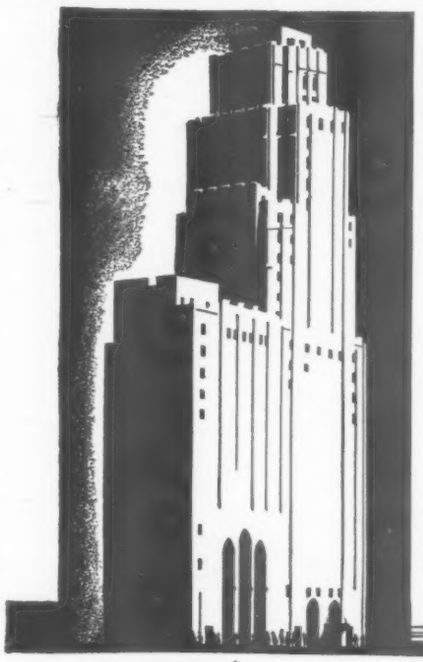

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Tallest Hotel of the West

+ + +

500 Rooms... All Outside

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Also Operating HOTEL WHITCOMB San Francisco

WOODS-DRURY CO., *Operators*

JAMES WOODS *President*

ERNEST DRURY *Manager*

WILLIAM TAYLOR HOTEL *at Civic Center*
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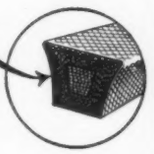
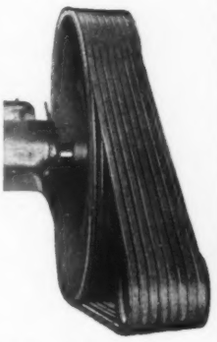


**It means a *perfect fit* in the sheave groove**



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# INDEX TO ADVERTISERS


Acme Fishing Tool Company.....274
Ajax Iron Works .....134-135
Alco Oil Tool Company.....141
Allen-Oliver Company .....137
Allis Chalmers Manufacturing Co.....209
Allsteel Products Company .....261
Alten's Foundry & Machine Works..259
American Association of Petroleum... Geologists .....
Aluminum Company of America..... 12
American Cable Company.....287
American Car & Foundry Co.....105
American Development Company.....
American Iron & Machine Works....178
American Hammered Piston Ring Co..145
American Meter Company..... 48
American Roller Bearing Company... 50
American Steel Works .....245
American Steel & Wire Company.... 91
American Telegraph & Telephone Company .....Second Cover
American Wells Works.....279
Andrews Steel Company .....283
B. K. Appleman .....200
Ash Grove Lime & Portland Cement Company ..... 18
Athey Truss Wheel Company..... 80
Axelson Manufacturing Company.....129

Baash-Ross Tool Company .....
Badgett Steam Lubricator Company..277
Baker Oil Tools, Incorporated..... 52
William S. Barnickel & Company.... 47
Barrett Company .....212-213
Bartlett-Hayward Company .....
Beaumont Iron Works .....
Beebe Brothers .....283
Bessemer Gas Engine Company....126-127
Bethlehem Steel Company..... 10
Black, Sivalls & Bryson.....Insert
Blackor Company .....163
Borden Company ..... 11
Braden Steel & Winch Company.....
Braden Steel Corporation.....
The Brewster Company.....
Bridgeport Machine Company.....
Broderick & Bascom Rope Company.284
Brown-Strauss Corporation.....272
Buckeye Traction Ditcher Company..277
Buffalo Bolt Company.....
Burns Tool Company .....
Butler Manufacturing Company.....
Byron Jackson Company..... 98

Cameron Iron Works .....115-116
Caterpillar Tractor Company .....
Central Alloy Steel Corporation..... 35
Chain Belt Company .....142-143
Chicago Bridge & Iron Works.....Insert
Chicago Pneumatic Tool Company.... 21
Clark Brothers Company ..... 19
Coastal Oil Finding Company.....282
Colona Manufacturing Company.....
Columbia Nut & Bolt Company.....189
Columbian Steel Tank Company..... 45
Continental Supply Company..... 13
Fred E. Cooper ..... 42
Cooper-Bessemer Corporation ....126-127
Cyclone Fence Company .....

Darling Valve & Manufacturing Co... 6
E. M. Dart Manufacturing Company..
Diamond Drill Carbon Company.....
Doheny-Stone Drill Company .....
Donovan Boiler Works .....111
Drane-Humphreys Company .....
Dresser & Gorton, Inc. .....214
S. R. Dresser Manufacturing Co..... 89
Driftmeter, Incorporated .....
The Drillometer Company .....185

Easton Car & Construction Company.
Eason-Therolf Tool Company.....279
Economy Pump & Oil Tool Company.157
T. H. Edelblute Company .....
Electric Controller Manufacturing Co..
Elliott Core Drilling Company .....
Empire Refineries ..... 32
Emsco Derrick & Equipment Co..... 9
Exchange Banks of Tulsa ..... 30
Expert Mechanic Shop .....282

Fenwick-Reddaway Manufacturing Co..289
First National Bank, Houston.....203
Fluid Packed Pump Company .....
Fort Worth Laboratories .....282
Franklin Valveless Engine Company..
Frick-Reid Supply Corporation .....113
Gardner-Denver Company .....
Gaso Pump & Burner Manufacturing Company .....146-147
Gates Rubber Company .....289
General Electric Company.....84-85
General Paint Corporation ..... 17
H. P. Gott Manufacturing Company..
Grant Oil Tool Company.....
Greene, Tweed & Company .....276
Guiberson Corporation .....108-109
Gulf Refining Company .....165
Gulf States Utilities Company.....

Erle P. Halliburton Company.....
Halliburton Oil Well Cementing Co... 5
Hanlon-Waters, Inc. .....
Happy Belting Company .....
Hardway & Cathey .....282
Haynes Stellite Company .....153
Harrisburg Pipe & Pipe Bending Company .....Third Cover
Hazard Wire Rope Company ..... 27
C. M. Heeter Sons & Company .....288
Hercules Motors Corporation ..... 28
Hercules Supply Company .....
Hercules Tool Company .....
Heydrick Mapping Company .....282
Hill, Hubbell & Company ..... 17
Hinderliter Tool Company .....180-181
Hirsch, Brown & Susman .....282
George O. Hollow Company.....
Charles N. Hough Manufacturing Co..
Houston Engineers .....
Houston National Bank..... 51
Hughes Tool Company.....Front Cover
Humble Oil & Refining Company....
Hyatt Roller Bearing Company.....

Christian Iden .....282
International Derrick & Equipment Company ..... 54
International Harvester Company.....
International Supply Company .....
Iverson Specialty Company .....196

Byron Jackson Company ..... 98
Jarecki Manufacturing Company ....
Jensen Brothers Manufacturing Co...178
Jones & Laughlin Steel Corporation.. 22
Johnson Formation Testing Corporation

Kelly, Dempsey & Company .....208
Kerotest Manufacturing Company .... 4
Kirk-Morrow Iron Works Company..222
Kontol Company .....
Landis Machine Company .....
Lankershim Hotel .....282
Larkin Company ..... 23
Layne & Bowler Company.....
Harry L. Lemons, Inc. .....265
Lincoln Electric Company .....103
Link Belt Company .....121-122-123-124
Lucey Products Corporation..... 97
Ludlow Valve Manufacturing Co.....
Lufkin Foundry & Machine Company.167

MacClatchie Manufacturing Company. 24
Maintenance Engineering Corporation. 80
McCollum Exploration Company .....282
D. S. Mair Machinery Corporation...
J. H. McEvoy & Company.....133
Majestic Hotel .....282
Maloney Tank Manufacturing Co.....266
Martin-Decker Corporation .....173
Martin Wagon Company .....
Metric Metal Works ..... 48
Mid-Continent Oil & Gas Assn. .....205
Mills Alloys, Inc. .....251
Miller Combination Bailer & Pump Co.
Mine Safety Appliance Company.....284
Robert J. Miller Company.....253
Lee C. Moore & Company.....257
J. P. Morris & DeLaVergne, Inc.....
Murray Tool & Supply Company....
National Petroleum Engineering Corp..
National Supply Companies ..... 20
National Tank Company .....
National Tools & Metals, Inc.....151
National Transit Pump & Machine Co..101
National Tube Company .....
Naylor Pipe Company ..... 94
New Jersey Asbestos Company.....
Norvell-Wilder Supply Company .....271

O. C. S. Manufacturing Company.....
Oakite Products, Inc. .....
O'Brien Steel Construction Company..281
Oil States Manufacturing Company..214
Oil Well Supply Company ..... 83
Oil Well Improvements Company....263
Oklahoma Contracting Company ....169
Oklahoma Pipe Line Company .....192
Oster Manufacturing Company.....92-93
Oxweld Acetylene Company .....

Page Steel & Wire Company.....
Parkersburg Machine Company .....288
Parkersburg Rig & Reel Company....
Patterson-Ballagh Corporation .....187
Pattin Brothers Company .....106
Peden Company .....229
Petroleum Rectifying Company .....
Petroleum Equipment Company .....
Petroleum Products Company.....
Pittsburgh-Des Moines Steel Co.....
Pittsburgh Equitable Meter Co. .....177
Pittsburgh Screw & Bolt Corporation. 25
Pittsburgh Steel Products Company..
Pittsburgh Valve, Foundry & Construction Company ..... 40
Portable Rig Company .....243
Pratt & Whitney Company .....199

Quasi-Arc, Inc. ..... 86

J. P. Ratigan .....149
Reed Roller Bit Company...Fourth Cover
Reading Iron Company .....193
Regan Forge & Engineering Company.159
Joseph Reid Gas Engine Company.... 31
Republic Supply Company ..... 44
Republic Iron & Steel Company..... 41
Resistcor Engineering Corporation....247
Rollway Bearing Company.....226
Roosevelt Hotel .....287

J. E. Shaffer Company .....
Shaffer Specialty Company .....
Shaffer Tool Works .....274
Sheldon Machinery Company .....
Sinclair Refining Company.....218
S-K-F Industries ..... 3
A. O. Smith Corporation ..... 29
E. M. Smith Mfg. Company ....130-131
H. C. Smith Manufacturing Company.175
Howard Smith Company ..... 37
South Chester Tube Company.....
Southern Engine & Pump Company...
Spang, Chalfant & Company .....
Specialty Oil Tool Company .....161
Springfield Wagon Company .....281
Eugene C. Stacy .....283
Standard Supply & Hardware Co.....276
Star Drilling Machine Company.....
George Steiner .....278
Jesse R. Stone .....282
Stoody Company .....155
Sullivan Machinery Company .....273
Taubman Supply Corporation ....194-195
William Taylor Hotel .....289

Technical Products Company .....197
Templeton, Kenley & Company .....
Texas Creosoting Company .....224
Texas Iron Works .....118-119-39
Texas Power & Light Company..... 34
The Thrift Corporation .....207
Timken Roller Bearing Company..... 8
Titusville Iron Works ..... 26
Triad Products Company .....
Trimont Manufacturing Company .... 38
Tyler Tube & Pipe Company.....287

Union Carbide & Carbon Corporation. 43
Union Chain & Manufacturing Company
Union Wire Rope Corporation.....
United Tractor Equipment Corp..... 7
Universal Engineering Company.....183

Vez Company .....
Victaulic Company of America..... 36
Victor Balata & Textile Belting Co...255

Wagner Electric Company .....
Waukesha Motor Company .....
C. W. Webster .....282
Westcott Valve Company ..... 14
Westinghouse Electric & Manufacturing Company .....138-139
West Texas Utilities Company ..... 16
Calvin Wheat Studios .....282
Wickwire-Spencer Steel Company..... 46
Wico Electric Company .....
Wiemann-Kammerer-Wright, Inc. ....171
Williamsport Wire Rope Company.... 49
J. H. Williams & Co. .....
Wilson Supply Company.....275
Wilson-Snyder Manufacturing Company
W-K-M Company .....190-191
T. T. Word Supply Company.....267
Wright Manufacturing Company..... 15
Wyatt Metal & Boiler Works.....

Yale & Towne Manufacturing Co.....
Young Engine Corporation ..... 33
Zero Hour Torpedo Company .....


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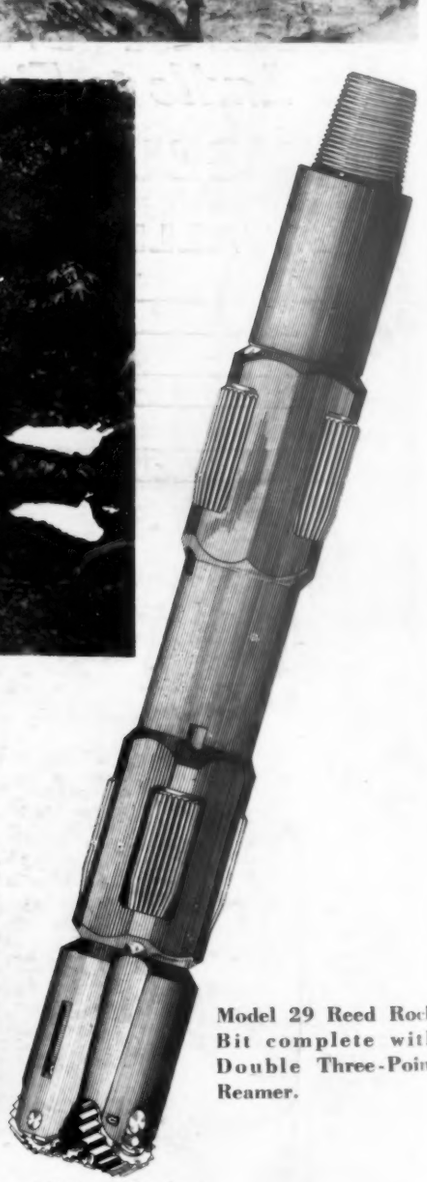

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1928
Vol. 48, No. 3
to
Vol. 52, No. 2

# 1928 - 1929 INDEX
# *To* The OIL WEEKLY

Specializing to the Producing and Pipe Line branches of the Oil Industry

1929
Vol. 52, No. 3
to
Vol. 56, No. 2

# 1928

## Subjects Covered in Index


Engineering—Technical—Research
- A. P. I.
- Conservation
- Field Practice and Methods
- Standardization
- Geological
- Geophysical

Features—News—Editorials
- Editorials
- Special Features
- Financial
- General News
- Law and Legislation
- Personal Pictures

Field Development and Exploration
- Proven Fields and Extensions
- Wildcats
- Gas Development
- Foreign News
- Land and Leasing

Markets and Statistical
- Market Reviews and Forecasts
- Production and Field Statistics
- Stocks and Storage

Pipe Line and Transportation
Maps


## Engineering — Technical — Research

### A. P. I.


| | Date, 1928 | Page |
|---|---|---|
| Institute Engineering Division Being Organized | Feb. 10 | 21 |
| A. P. I. Committee on Research Appointed | Feb. 17 | 60 |
| A. P. I. Starts Scientific Study of Corrosion | Mar. 2 | 40 |
| Eastern Engineers Organize Under A. P. I. | Mar. 2 | 45 |
| Engineers Form New Technical Branch at Los Angeles. *By Brad Mills* | April 20 | 33 |
| Field Men Take Up Practical Problems at Fort Worth Meeting | May 4 | 37 |
| A. P. I. Divisional Meet in Pennsylvania | May 4 | 62 |
| New A. P. I. Posters Ready for Distribution | May 18 | 47 |
| A. P. I. Annual Meeting at Chicago in December | June 1 | 27 |
| New A. P. I. Division Interests Engineers. *By Spencer W. Robinson* | June 15 | 27 |
| Engineering Division Wants Data on Field Methods | June 22 | 33 |
| Operators Want Field Meetings to Study Problems | Sept. 14 | 30 |
| Petroleum Engineers Meet at Tulsa Just Before Exposition | Oct. 12 | 37 |
| Program Outlined for A. P. I. Annual Meeting | Nov. 9 | 27 |
| American Petroleum Institute Officers Named | Dec. 7 | 42 |
| A. P. I. Makes Constructive Organization Plans | Dec. 7 | 43 |
| Institute Division Will Seek Data on Field Problems | Dec. 14 | 41 |


### CONSERVATION

#### 1. CONSERVATION AND THE GOVERNMENT


| | Date, 1928 | Page |
|---|---|---|
| Government Has Ready Means of Limiting Production | Jan. 6 | 30 |
| No Enthusiasm in "Committee of Nine" Hearing. *By Clarence L. Linz* | Jan. 27 | 29 |
| "Committee of Nine" Recommends Co-operative Law | Feb. 10 | 17 |
| Government Favors Curtailment in New Mexico | June 1 | 26 |


#### 2. GENERAL


| | Date, 1928 | Page |
|---|---|---|
| Possible Petroleum Substitutes | Jan. 20 | 27 |
| Co-operative Fuel Research Program Shows Progress | Jan. 20 | 31 |
| Committee to Study Conservation | Feb. 3 | 48 |
| Farish Shows Need for Production Curtailment in Texas. | Mar. 16 | 29 |
| Plan Would Remove Need for Offset Drilling. *By Hampton A. Steele* | Mar. 23 | 41 |
| Wildcat Control Committee Drafts Plan of Curtailment | April 13 | 28 |
| Set Up Machinery for Putting Proration Into Effect | April 27 | 27 |
| Proration Effort Reduces Output First Half of 1928. *By A. R. McTee* | July 27 | 139 |
| Association Committee Drafting Proposed Standard Legislation | Nov. 23 | 30 |
| Rocky Mountain Association Favors Curtailment and Unit Control | Nov. 23 | 64 |
| Production Control. *By Ray M. Collins* | Dec. 7 | 51 |
| Production Curtailment in Texas. *By J. Elmer Thomas* | Dec. 7 | 54 |
| Curtailment Resolution Adopted by Mid-Continent Ass'n. | Dec. 28 | 27 |


#### 3. CALIFORNIA


| | Date, 1928 | Page |
|---|---|---|
| Sub-Committees in California Conservation Movement | Feb. 10 | 21 |
| California Conservation Move Gets Start at Ventura. *By Brad Mills* | Mar. 16 | 33 |
| How California Plans to Accomplish Gas Conservation. *By Martin Van Couvering* | April 20 | 29 |
| Progress Made in Gas Conservation in California. *By R. D. Bush* | Sept. 25 | 28 |
| Gas Problems Featured in Progress of California Engineers. *By Brad Mills* | Sept. 28 | 29 |
| Santa Fe Springs Operators Plan Conservation | Oct. 12 | 29 |
| Proration at Ventura Field. *By T. E. Swigart* | Oct. 12 | 46 |
| Gas Conservation Committee May Limit Oil Output | Oct. 26 | 39 |
| Conservation Plan Submitted for Santa Fe Springs | Nov. 9 | 42 |
| Santa Fe Springs Operators Want Curtailment Plan Presented | Nov. 30 | 39 |
| Gas Conservation and Production in California. *By M. E. Lombardi* | Dec. 7 | 72 |


#### 4. IN THE MID-CONTINENT


| | Date, 1928 | Page |
|---|---|---|
| Curtailment Will Spread to Other Mid-Continent Fields. *By Wallace Davis* | Mar. 30 | 40 |
| Producers Move to Curtail in Pottawotamie County | April 13 | 57 |
| Agreement Extended Another 30 Days in Little River | May 18 | 35 |
| Definite Action Due on Little River This Week | July 6 | 36 |
| Little River Operators Firm in Proration Resolve | July 13 | 28 |
| Oklahoma Output to Be Limited to 700,000 Barrels | Sept. 21 | 28 |


#### 5. IN TEXAS


| | Date, 1928 | Page |
|---|---|---|
| Hendrick Field Operators Appoint Conservation Committee. *By H. H. King* | Feb. 10 | 23 |
| Texas Commission Calls Meeting on Conservation Move. | Mar. 9 | 44 |
| Winkler Conservation Move Follows Commission Conference. *By A. R. McTee* | Mar. 16 | 25 |
| Commission Promises to Select Plan for Hendrick Situation. *By A. R. McTee* | April 20 | 27 |
| Hendrick Umpire Arranging Details of Proration Order. *By H. H. King* | May 4 | 27 |
| Unit Operation Successful in Coleman County, Texas | May 11 | 41 |
| State Line Area Gives Proration Problem New Angle. *By H. H. King* | May 25 | 43 |
| Reduce Basis of Proration in Yates Field. *By H. H. King* | May 25 | 45 |
| Commission Calls Conference on North Winkler County. *By H. H. King* | June 1 | 25 |
| Llano Operators Want Separate Deal From Hendrick | June 8 | 27 |
| Railroad Commission Makes Yates Proration Official | June 29 | 27 |
| North Winkler County Operators Agree on Proration | July 6 | 37 |
| Allowed Runs From Yates Field Given Increase. *By H. H. King* | July 24 | 35 |
| Chalk-Roberts Runs Start Under Proration | Aug. 31 | 29 |
| Operators Agree to Hold Hendrick Output at Present Figure. *By A. R. McTee* | Sept. 7 | 30 |
| Allowed Production From Hendrick Field Reduced by Commission. *By H. H. King* | Sept. 21 | 27 |
| Hendrick Operators Protest Output Cut But Comply. *By H. H. King* | Oct. 12 | 33 |
| No Agreement Plan Reached in Howard-Glasscock Proration. *By H. H. King* | Oct. 26 | 31 |


### FIELD PRACTICE AND METHODS

#### AIR AND GAS LIFT


| | Date, 1928 | Page |
|---|---|---|
| Gas Lift Increases Oxford Output | Jan. 20 | 92 |
| Increasing Oil Well Flow by Controlling Gas-Oil Ratio. | Feb. 3 | 42 |
| Developments in the Air-Gas Lift in the Mid-Continent. *By C. V. Millikan* | Mar. 2 | 38 |
| Recovery From Unconsolidated Sands by Water Flooding. *By L. C. Uren and E. H. Fahmy* | Mar. 9 | 32 |
| Ten Years' Application of Air at Hamilton Corners. *By Charles R. Fettke* | Mar. 9 | 27 |
| The Principles of Air-Lift Pumping. *By J. H. Pound* | Mar. 30 | 73 |
| Rio Bravo Air Lift Installation at Pierce Junction. *By Melbert Schwarz* | April 6 | 34 |
| New System for Air-Gas Application | May 4 | 72 |
| Economic Effect of Use of Gas in Oil Recovery. *By O. E. Bennett* | May 18 | 53 |
| A Bottom Hole Study of the Air Lift (in two parts). *By Harry Pennington* | Aug. 10<br>Aug. 17 | 27<br>46 |
| Small Gas-Lift Plant at Seal Beach Most Flexible in West. *By Brad Mills* | Sept. 7 | 92 |
| Air Makes Lifting Excess Liquid Profitable at Lockport. *By Jack Logan* | Oct. 19 | 170 |
| Intermittent Injection of Gas in Gas Lift Installations. *By Morgan Walker* | Oct. 19 | 142 |

| | Date, 1928 | Page |
|---|---|---|
| Fluid Levels, Back Pressure, and Submergence in Oil Wells *By S. F. Shaw* | Nov. 30 | 45 |

**CEMENTING**

| | | |
|---|---|---|
| Use of Cement in Shutting Off Bottom Water *By W. V. Vietti and W. A. Oberlin* | Feb. 3 | 27 |
| New Type Pressure Seal Used On Deep Cementing Job | Feb. 17 | 226 |
| Concrete Case Around Casing Proves Big Economy | Aug. 24 | 38 |
| Cementing Oil Wells *By Harry Pennington* | Oct. 19 | 182 |
| Mixing Device Removes Guess Work From Well Cementing *By Gale B. DeWitt* | Dec. 21 | 39 |

**CROOKED HOLES**

| | | |
|---|---|---|
| The Problem of Crooked Holes *By F. H. Lahee* | Aug. 31 | 34 |
| Reamers and Controlled Feed Tend to Make Straight Hole | Sept. 28 | 34 |
| Some Causes and Effects of Crooked Holes *By J. E. McKee* | Nov. 23 | 60 |
| Notes on the Courses of Drill Holes *By Martin van Couvering* | Nov. 30 | 43 |

**GENERAL DRILLING AND PRODUCING**

| | | |
|---|---|---|
| A Testing Ground for Production Methods *By Wallace Davis* | Jan. 6 | 32 |
| Sampling and Coring in Prospecting for Oil and Gas *By W. F. Cloud* | Feb. 24 | 21 |
| Methods and Results of Using Borium Mounted Bits in California *By W. F. Stoody* | April 20 | 31 |
| Careless Selection of Fishing Tools Often Disastrous *By R. A. Mueller and J. D. Isaacks* | April 27 | 48 |
| Fishing Deserves As Much Thought As Any Work in Field | April 27 | 51 |
| Record of Deep Producer Reveals Long Beach Drilling Conditions | May 18 | 43 |
| Development and Production Methods in West Texas *By Harold Vance* | June 22 | 34 |
| Advances in Rocky Mountain Operating Practice *By Fred E. Wood* | June 29 | 50 |
| Core Drilling With Cable Tools in the Appalachian Region *By R. T. Zook* | July 13 | 29 |
| Economical Drilling on Wildcat in Oklahoma | July 13 | 38 |
| Casing Protectors on Drill Pipe *By M. Manning* | Sept. 21 | 34 |
| Snubbing Device Used in Tubing High Pressure Wells *By Jack Logan* | Sept. 28 | 31 |
| Committee Plans Method of Controlling Richland Gasser | Oct. 12 | 41 |
| Rotary Drilling Problems *By R. S. Cartwright* | Nov. 2 | 41 |
| Rotary vs. Standard Tools in Rocky Mountains *By Ray O. Armstrong* | Nov. 30 | 51 |
| Advantages of Large Diameter Wells in Exploitation of Oil Fields *By L. C. Uren, F. F. Davis and W. L. Jarvis* | Dec. 14 | 53 |
| Handling Flowing Wells in the Mid-Continent Field *By J. R. McWilliams* | Dec. 14 | 60 |
| Derricks and Heights *By Harry Pennington* | Dec. 21 | 35 |

**REPRESSURING**

| | | |
|---|---|---|
| Repressuring Doubles Output of Small Lease *By George Reid* | Feb. 24 | 24 |
| Effect of Repressuring Sand During Flush Stage of Production *By E. V. Foran* | Mar. 2 | 29 |
| Repressuring Proves Interesting Experiment at Dominguez *By Brad Mills* | Mar. 23 | 33 |
| Repressuring Small Isolated Pool Presents Peculiar Problems *By George Reid* | April 27 | 98 |
| Repressuring Prolongs Productiveness of Bartlesville Sand *By Wallace Davis* | June 8 | 37 |
| Nowata Repressuring Plant Still Good After 10 Years *By George Reid* | June 15 | 41 |
| Repressuring Profitable on Old Oklahoma Lease *By George Reid* | Aug. 24 | 27 |
| Gas Storage Benefits Oil Production in Domingues Field *By E. W. Master* | Oct. 5 | 41 |
| Storage and Repressuring in Brea-Olinda *By F. W. Lake* | Oct. 12 | 52 |
| Repressuring During Early Stages of Development *By C. E. Beecher* | Oct. 19 | 132 |
| Relative Efficiencies of Air and Gas in Pressure Drive *By Harry H. Power* | Oct. 19 | 150 |
| Installation and Maintenance of Oil Field Compressors *By H. L. Kauffman* | Nov. 9 | 102 |

**PUMPING**

| | | |
|---|---|---|
| Texon's Big Power Lifts Production From 10 Deep Wells *By A. R. McTee* | Aug. 3 | 30 |
| Water Column Replaces Rods in Pumping Equipment | Aug. 10 | 51 |
| Oil Cleaned Centrifugally Reduces Cost of Operating Diesel-Type Pumping Plants *By H. L. Kauffman* | Sept. 7 | 41 |
| Deep Well Pumping in California *By Hallan N. Marsh* | Nov. 9 | 50 |
| Action of Deep Well Pumps *By F. W. Lake* | Dec. 14 | 44 |
| Some Important Factors In Pumping Wells (symposium) | Dec. 28 | 51 |
| Central Power Pumping *By L. A. Ogden* | Dec. 28 | 51 |
| Sucker Rod Stresses and Counterbalancing *By B. H. Griswold* | Dec. 28 | 52 |
| Volumetric Efficiency of Pumping Wells *By D. L. Tras* | Dec. 28 | 54 |
| Sucker Rods and Deep Well Pumping *By W. K. Whiteford* | Dec. 28 | 52 |
| Working Barrels and Valves *By L. B. Holland* | Dec. 28 | 54 |
| Pumping Records *By J. R. McWilliams* | Dec. 28 | 56 |
| Combination Pumping and Flowing Wells *By Morgan Walker* | Dec. 28 | 58 |

**WIRE LINES**

| | | |
|---|---|---|
| Wire Line Lubrication *By W. C. Thomas* | Sept. 14 | 35 |
| Some Common Causes of Wire Line Failures *By J. D. Isaacks* | Oct. 26 | 131 |
| Inspection and Care of Wire Ropes *By Glover McConnell* | Nov. 23 | 43 |
| Tulsa Meeting Discussion Centers on Wire Lines *By Wallace Davis* | Nov. 23 | 56 |

**LEASE ECONOMY SUGGESTIONS**

| | | |
|---|---|---|
| Labor Saving Devices Make Small Leases Profitable *By Brad Mills* | Jan. 6 | 35 |
| Corrugated Pipe Jackets Protect Gas Line From Shocks *By F. W. Kirk* | Jan. 13 | 39 |
| Investigation Shows Value of Burying Gas Pipe Lines *By E. L. Rawlins and T. W. Johnson* | Mar. 23 | 35 |
| Waste Oil and Tank Bottoms Profitably Reclaimed *By Brad Mills* | April 6 | 41 |
| Water and Lye Solution Cleans Wells of Paraffin *By L. L. Betchel and William O. Blenkarn* | May 4 | 39 |
| Montebello Lease Includes Many Equipment Conveniences *By Brad Mills* | May. 4 | 76 |
| Progress Made in Study of Pipe Corrosion and Protection *By W. G. Hagen* | May 11 | 29 |
| Old Tank Bottoms Still Have Value *By Wallace Davis* | May 25 | 110 |
| Empire Finds Re-conditioning Old Lines Profitable *By Wallace Davis* | May 25 | 60 |
| Salvage Department Reclaims Used Material at Profit *By Brad Mills* | May 25 | 104 |
| Creosote Retards Ravages of Sulphuric Acid on Tank Roofs *By J. D. Isaacks* | May 25 | 144 |
| Evaporation Losses and Their Reduction *By James H. Westcott* | May 25 | 148 |
| Mud-Hog Pump on Old Log Wagon Is Handy Outfit | June 1 | 28 |
| Takes Real Economy to Make Lease Profitable—It Is | June 8 | 62 |
| Cleaning Plant Makes Obnoxious Gas Useable *By Jack Logan* | July 27 | 148 |
| Inert Gas Used to Reduce Fire Hazard on Tanks *By George Reid* | July 27 | 67 |
| Automatic Flow Device Cuts Lifting Cost on Old Lease *By Wallace Davis* | Oct. 19 | 319 |
| Analyzing Operation First Step in Lease Economy *By A. R. Lewis* | Nov. 16 | 35 |

**MISCELLANEOUS**

| | | |
|---|---|---|
| Pinching Partly Relieves Hendrick Water Trouble *By H. H. King* | Jan. 6 | 41 |
| Handling Congealing Oils in Salt Creek Field *By F. E. Wood, H. W. Young and A. W. Buell* | Jan. 27 | 48 |
| "Swaying Gate Posts" Solve Problem of Getting Shackle Rods Across Road | Feb. 3 | 46 |
| Lightning Rods for Tank Protection *By Wallace Davis* | April 30 | 34 |
| How to Calculate Friction Loss for Flow of Gas in Pipes *By H. L. Kauffman* | May 4 | 58 |
| Trace Teapot Drainage With Dyes in Underground Water | May 18 | 52 |
| Efficiency in Handling Motor Transport Problems *By Wallace Davis* | May 25 | 107 |
| Co-operation Overcomes Pollution Problem at Long Beach *By Brad Mills* | June 1 | 38 |
| Different Explosives Needed for Different Sands *By George Reid* | June 15 | 38 |
| Crude Shippers Make Advances in Rack Construction *By A. R. McTee* | July 27 | 126 |
| Recovery Investigation Report Covered in Engineers Paper | Aug. 24 | 42 |
| Duty of Formation Gas *By Harry Pennington* | Aug. 24 | 48 |
| Operators Under-estimate Damage of Sulphur to Tanks *By J. B. Ray* | Aug. 31 | 89 |
| "Pipe Line Finder" is Device for Locating Buried Lines *By Jack Logan* | Sept. 7 | 43 |
| Use of Twin Steam Engine Brought on Heavy Rotary Equipment—(part one) *By Harry Pennington* | Sept. 7 | 47 |
| The Big Rotary Rig of Today | Sept. 14 | 46 |
| —(parts two and three) *By Harry Pennington* | Sept. 21 | 50 |
| West Texas Operations Bring New Field Practices *By A. S. Field* | Sept. 14 | 31 |
| Engineering Report on Texhoma-Gose Oil Pool, Texas | Sept. 21 | 38 |
| Oil Recovery Was a Science From the Beginning *By George Reid* | Oct. 26 | 53 |
| Increasing Recovery in Northern Appalachian Oil Fields *By Paul D. Torrey* | Oct. 26 | 61 |
| Unit Operation of Delaware Extension Pool, Oklahoma *By I. L. Dunn and James O. Lewis* | Dec. 7 | 60 |

## STANDARDIZATION


| | Date, 1928 | Page |
|---|---|---|
| Results and Advantages of A. P. I. Standard Tool Joints — *By R. A. Wilson* | Jan. 6 | 91 |
| Advantages of A. P. I. Standard Pumping Equipment — *By T. E. Swigart* | Feb. 3 – Feb. 10 | 51 – 44 |
| A. P. I. Standardization Meeting Set for June 12 to 15 | April 27 | 54 |
| Colorado Springs Standardization Program | June 8 | 32 |
| Method for Appraising Results of Production Control — *By Hallan N. Marsh* | June 15 | 28 |
| Standardization Work Turns to Field Application — *By Spencer W. Robinson* | June 22 | 27 |
| Digest of Semi-Annual Standardization Conference | June 22 | 29 |
| Semi-Annual Standardization Conference Registration List | June 22 | 32 |
| Necessity for Uniform Accounting Instructions and Code — *By C. Y. Colgan* | July 13 | 47 |
| A. P. I. Code on Measuring Field Production Tanks | Aug. 31 | 39 |
| National Standard for Pressure Gauges Proposed | Aug. 31 | 56 |
| A. P. I. to Standardize Crude Measuring and Sampling | Sept. 28 | 66 |


## GEOLOGICAL


| | Date, 1928 | Page |
|---|---|---|
| Ten Years' Application of Air at Hamilton Corners — *By Charles R. Fettke* | Mar. 9 | 27 |
| Program Provides Busy Session for Geologists | Mar. 16 | 41 |
| Engineering Report on Wortham Field, Texas | Mar. 16 | 42 |
| Regional Organization Favored By Geologists — *By Brad Mills* | Mar. 30 | 43 |
| Paleontologists With A. A. P. G. at San Francisco | Mar. 30 | 65 |
| Developments in Southern California Since 1923 — *By Joseph Jensen and Glenn D. Robertson* | April 13 | 31 |
| Exploration in Southwestern Humboldt County, California | May 11 | 54 |
| Gas Sands in the Coastal Plains of Southwest Texas — *By J. B. Best* | May 18 | 58 |
| Development and Production Methods in West Texas — *By Harold Vance* | June 22 | 34 |
| Smith-Ellis Oil Field, Brown County, Texas — *By Willis Storm* | Aug. 3 | 37 |
| Second Edwards Lime Field in Texas (Caldwell County) — *By Richard A. Jones* | Aug. 10 | 34 |
| Structure Favors Oil and Gas Production in New Jersey — *By Alfred C. Hawkins* | Aug. 17 | 28 |
| History and Geology of Latest California Field (Hawthorne-Lawndale) — *By George Elliott* | Sept. 7 | 31 |
| Geologists Will Meet at Fort Worth | Sept. 14 | 54 |
| Big Lake Well Smashes Depth Record — *By H. H. King* | Sept. 14 | 61 |
| Mechanics of Balcones Fault System — *By Richard A. Jones* | Oct. 19 | 306 |
| Los Angeles Geologists Want More Money For Survey | Nov. 9 | 44 |
| Table Showing West Texas Discovery Wells | July 27 | 98 |


## GEOPHYSICAL


| | Date, 1928 | Page |
|---|---|---|
| Geophysical Prospecting Methods Deserve Serious Consideration | Jan. 27 | 33 |
| Electric Methods of Applied Geophysics — *By Dr. Erich Pautsch* | Feb. 24 | 33 |
| Kelso Bayou Dome is Outstanding Seismograph Discovery — *By Jack Logan* | Mar. 2 | 43 |
| Adaptation of Magnet Instruments and Methods to Economic Geology — *By Dr. Erich Pautsch* | July 13 – July 20 | 48 – 43 |
| Geophysics Reveals Vast Petroleum Deposits in Coast Region — *By Jack Logan* | Nov. 16 | 40 |
| Tabular History of Geophysically Discovered Salt Domes in Texas | Nov. 16 | 42 |
| Tabular History of Geophysically Discovered Salt Domes in Louisiana | Nov. 16 | 44 |


# Features — News — Editorials

## EDITORIALS


| | Date, 1928 | Page |
|---|---|---|
| Waste and Conservation — *By R. L. Dudley* | Jan. 20 | 26 |
| State Co-operation | Mar. 16 | 28 |
| Foreign Opportunities | Mar. 16 | 28 |
| The Producers' Problem — *By R. L. Dudley* | Mar. 16 | 28 |
| Pertinent Market Facts and Figures | Mar. 23 | 38 |
| The Internationalization of Oil — *By R. L. Dudley* | Mar. 30 | 47 |
| The Gas Industry's Problem — *By N. C. McGowan* | May 11 | 28 |
| On the Coming Exposition | May 18 | 32 |
| An Opoprtunity to Reach the Field Man | Sept. 14 | 30 |
| The Exposition at Tulsa | Oct. 12 | 29 |
| Honoring the Old Timers | Oct. 26 | 50 |
| Exposition a Complete Success — *By Grady Triplett* | Nov. 9 | 104 |
| Outside Leadership | Nov. 16 | 28 |
| Executives Plan Production Curtailment by Districts | Dec. 14 | 40 |


## SPECIAL FEATURES

### ECONOMIC SITUATION


| | Date, 1928 | Page |
|---|---|---|
| Wider Markets Suggested As Situation Cure — *By Joseph E. Pogue* | Jan. 13 | 29 |
| Reference to Governmental Control | Jan. 27 | 24 |
| Three-Fourths of World's Production in Last Ten Years — *By A. R. McTee* | Jan. 27 | 26 |
| Nine Hundred Forty Million Barrel Crude Demand — *By H. J. Struth* | Feb. 17 | 43 |
| New Area Could Further Increase Oklahoma's Production — *By Wallace Davis* | Feb. 17 | 47 |
| The Fable of the Sick Man — *By Arthur Knapp* | Feb. 17 | 62 |
| Farish Says Caution Needed During Present Year | Feb. 17 | 166 |
| Economic Significance of West Texas Development — *By C. T. Watson* | Mar. 2 | 31 |
| The Trend of the Petroleum Situation — *By Joseph E. Pogue* | Mar. 2 | 33 |
| An Economic Analysis of the Fuel Oil Situation — *By Arthur Knapp* | Mar. 9 | 25 |
| Stock Situation Reflected in Crude Postings — *By A. R. McTee* | Mar. 16 | 41 |
| America Holds Key to Over-Production, Says Mexican-Eagle Head | April 27 | 34 |
| Review Reveals Depression Largely a Matter of Psychology — *By A. R. McTee* | May 18 | 30 |
| California Has Storage Capacity of 175,000,000 Barrels — *By Brad Mills* | May 25 | 64 |
| Statistics Foreshadow Early Advance in Crude Markets — *By H. J. Struth* | July 27 | 53 |
| The Price of Prosperity in the Petroleum Industry — *By Joseph E. Pogue* | Sept. 21 | 33 |
| Fewer Wells Being Drilled This Year Than in 1927 — *By Brad Mills* | Oct. 12 | 28 |
| Oil Supply, Demand, and Price in 1928 — *By Campbell Osborne* | Oct. 19 | 124 |
| Estimate Shows World Output Slightly Up in 1928 — *By Valentine R. Garfias* | Oct. 19 | 60 |
| Oil Business Should Be Better Organized to Stabilize Production — *By E. B. Reeser* | Dec. 21 | 43 |


### PERSONNEL AND SAFETY


| | Date, 1928 | Page |
|---|---|---|
| Union Oil Company Has Novel Employee Patent Policy Plan | Jan. 13 | 31 |
| Safety First at Lockport — *By Jack Logan* | April 13 | 51 |
| Accidents at Oil Wells Due to Use of Pipe Tools | May 25 | 156 |
| This Type of Field Camp Reduces Labor Turnover | June 8 | 30 |
| Oiling the Machinery of Education — *By A. R. McTee* | June 8 | 40 |
| Mid-West Accident Prevention Gets Results — *By E. H. Denny* | June 8 | 58 |
| West Texas Field Workers Have Livable Surroundings — *By A. R. McTee* | Aug. 31 | 32 |
| Gulf Maintains Model Camp in West Texas | Sept. 7 | 57 |
| Old Man Bonehead | Nov. 16 | 97 |


### OPERATING


| | Date, 1928 | Page |
|---|---|---|
| Reduction of Breathing Losses from Vapor-Tight Lease Tanks — *By Ludwig Schmidt* | Jan. 6 | 37 |
| Sand Production Makes Serious Problem at Coalinga — *By Brad Mills* | Jan. 13 | 41 |
| Cratered Gasser Lowering Pressure in White Point Field — *By Jack Logan* | Feb. 3 | 35 |
| Operating Efficiency Responsible for Record Output — *By A. R. McTee* | Feb. 17 | 45 |
| Sweet Lake Rivals Foreign Fields in Drilling Difficulties — *By Jack Logan* | Mar. 16 | 36 |
| Regular Inspection of Properties Betters Lease Conditions | Mar. 16 | 104 |
| Roxana Drills 61 Producers — One Dry Hole at Chirchill — *By Wallace Davis* | April 13 | 46 |
| One Example of What Happens to Wells When Shut In | April 27 | 60 |
| Providing Chemical Treatment for Petroleum Emulsions — *By Charles W. Cuno* | April 27 | 66 |
| Yount-Lee Spindle Top Operations Substantial and Efficient — *By Jack Logan* | May 18 | 44 |
| Acid Well Would Prevent Sulphur Attack on Tank Bottoms — *By A. C. Holzapfel* | May 25 | 76 |
| Rotary Equipment Keeps Pace With Demands — *By Brad Mills* | July 20 | 28 |
| A Treat For the Map Department — *By Wallace Davis* | July 20 | 39 |
| New Corrosion Resisting Cast Pipe for the Petroleum Industry — *By Gray Morris* | July 20 | 89 |
| Water and Gas Corrosion Combine to Make Work Difficult in West Texas — *By A. R. McTee* | July 27 | 57 |
| Naval Maneuvers Bring Improvement in Handling Fuel — *By G. K. Spencer* | Aug. 3 | 27 |
| Extension Tube Adds Efficiency to Foam Equipment — *By Brad Mills* | Aug. 17 | 40 |


### PERSONALITIES IN THE INDUSTRY


| | Date, 1928 | Page |
|---|---|---|
| How Oil Men Play — Bill (W. H.) Geis Likes to Spend His Spare Time Just Looking at Rocks | Jan. 20 | 36 |

| | Date, 1928 | Page |
|---|---|---|
| Fluid Levels, Back Pressure, and Submergence in Oil Wells<br>*By S. F. Shaw* | Nov. 30 | 45 |
| **CEMENTING** | | |
| Use of Cement in Shutting Off Bottom Water<br>*By W. V. Vietti and W. A. Oberlin* | Feb. 3 | 27 |
| New Type Pressure Seal Used On Deep Cementing Job | Feb. 17 | 226 |
| Concrete Case Around Casing Proves Big Economy | Aug. 24 | 38 |
| Cementing Oil Wells<br>*By Harry Pennington* | Oct. 19 | 182 |
| Mixing Device Removes Guess Work From Well Cementing<br>*By Gale B. DeWitt* | Dec. 21 | 39 |
| **CROOKED HOLES** | | |
| The Problem of Crooked Holes<br>*By F. H. Lahee* | Aug. 31 | 34 |
| Reamers and Controlled Feed Tend to Make Straight Hole | Sept. 28 | 34 |
| Some Causes and Effects of Crooked Holes<br>*By J. E. McKee* | Nov. 23 | 60 |
| Notes on the Courses of Drill Holes<br>*By Martin van Couvering* | Nov. 30 | 43 |
| **GENERAL DRILLING AND PRODUCING** | | |
| A Testing Ground for Production Methods<br>*By Wallace Davis* | Jan. 6 | 32 |
| Sampling and Coring in Prospecting for Oil and Gas<br>*By W. F. Cloud* | Feb. 24 | 21 |
| Methods and Results of Using Borium Mounted Bits in California<br>*By W. F. Stoody* | April 20 | 31 |
| Careless Selection of Fishing Tools Often Disastrous<br>*By R. A. Mueller and J. D. Isaacks* | April 27 | 48 |
| Fishing Deserves As Much Thought As Any Work in Field | April 27 | 51 |
| Record of Deep Producer Reveals Long Beach Drilling Conditions | May 18 | 43 |
| Development and Production Methods in West Texas<br>*By Harold Vance* | June 22 | 34 |
| Advances in Rocky Mountain Operating Practice<br>*By Fred E. Wood* | June 29 | 50 |
| Core Drilling With Cable Tools in the Appalachian Region<br>*By R. T. Zook* | July 13 | 29 |
| Economical Drilling on Wildcat in Oklahoma | July 13 | 38 |
| Casing Protectors on Drill Pipe<br>*By M. Manning* | Sept. 21 | 34 |
| Snubbing Device Used in Tubing High Pressure Wells<br>*By Jack Logan* | Sept. 28 | 31 |
| Committee Plans Method of Controlling Richland Gasser | Oct. 12 | 41 |
| Rotary Drilling Problems<br>*By R. S. Cartwright* | Nov. 2 | 41 |
| Rotary vs. Standard Tools in Rocky Mountains<br>*By Ray O. Armstrong* | Nov. 30 | 51 |
| Advantages of Large Diameter Wells in Exploitation of Oil Fields<br>*By L. C. Uren, F. F. Davis and W. L. Jarvis* | Dec. 14 | 53 |
| Handling Flowing Wells in the Mid-Continent Field<br>*By J. R. McWilliams* | Dec. 14 | 60 |
| Derricks and Heights<br>*By Harry Pennington* | Dec. 21 | 35 |
| **REPRESSURING** | | |
| Repressuring Doubles Output of Small Lease<br>*By George Reid* | Feb. 24 | 24 |
| Effect of Repressuring Sand During Flush Stage of Production<br>*By E. V. Foran* | Mar. 2 | 29 |
| Repressuring Proves Interesting Experiment at Dominguez<br>*By Brad Mills* | Mar. 23 | 33 |
| Repressuring Small Isolated Pool Presents Peculiar Problems<br>*By George Reid* | April 27 | 98 |
| Repressuring Prolongs Productiveness of Bartlesville Sand<br>*By Wallace Davis* | June 8 | 37 |
| Nowata Repressuring Plant Still Good After 10 Years<br>*By George Reid* | June 15 | 41 |
| Repressuring Profitable on Old Oklahoma Lease<br>*By George Reid* | Aug. 24 | 27 |
| Gas Storage Benefits Oil Production in Domingues Field<br>*By E. W. Master* | Oct. 5 | 41 |
| Storage and Repressuring in Brea-Olinda<br>*By F. W. Lake* | Oct. 12 | 52 |
| Repressuring During Early Stages of Development<br>*By C. E. Beecher* | Oct. 19 | 132 |
| Relative Efficiencies of Air and Gas in Pressure Drive<br>*By Harry H. Power* | Oct. 19 | 150 |
| Installation and Maintenance of Oil Field Compressors<br>*By H. L. Kaufman* | Nov. 9 | 102 |
| **PUMPING** | | |
| Texon's Big Power Lifts Production From 10 Deep Wells<br>*By A. R. McTee* | Aug. 3 | 30 |
| Water Column Replaces Rods in Pumping Equipment | Aug. 10 | 51 |
| Oil Cleaned Centrifugally Reduces Cost of Operating Diesel-Type Pumping Plants<br>*By H. L. Kaufman* | Sept. 7 | 41 |
| Deep Well Pumping in California<br>*By Hallan N. Marsh* | Nov. 9 | 50 |
| Action of Deep Well Pumps<br>*By F. W. Lake* | Dec. 14 | 44 |
| Some Important Factors In Pumping Wells (symposium) | Dec. 28 | 51 |
| Central Power Pumping<br>*By L. A. Ogden* | Dec. 28 | 51 |
| Sucker Rod Stresses and Counterbalancing<br>*By B. H. Griswold* | Dec. 28 | 52 |
| Volumetric Efficiency of Pumping Wells<br>*By D. L. Trax* | Dec. 28 | 54 |
| Sucker Rods and Deep Well Pumping<br>*By W. K. Whiteford* | Dec. 28 | 52 |
| Working Barrels and Valves<br>*By L. B. Holland* | Dec. 28 | 54 |
| Pumping Records<br>*By J. R. McWilliams* | Dec. 28 | 56 |
| Combination Pumping and Flowing Wells<br>*By Morgan Walker* | Dec. 28 | 58 |
| **WIRE LINES** | | |
| Wire Line Lubrication<br>*By W. C. Thomas* | Sept. 14 | 35 |
| Some Common Causes of Wire Line Failures<br>*By J. D. Isaacks* | Oct. 26 | 131 |
| Inspection and Care of Wire Ropes<br>*By Glover McConnell* | Nov. 23 | 43 |
| Tulsa Meeting Discussion Centers on Wire Lines<br>*By Wallace Davis* | Nov. 23 | 56 |
| **LEASE ECONOMY SUGGESTIONS** | | |
| Labor Saving Devices Make Small Leases Profitable<br>*By Brad Mills* | Jan. 6 | 35 |
| Corrugated Pipe Jackets Protect Gas Line From Shocks<br>*By F. W. Kirk* | Jan. 13 | 39 |
| Investigation Shows Value of Burying Gas Pipe Lines<br>*By E. L. Rawlins and T. W. Johnson* | Mar. 23 | 35 |
| Waste Oil and Tank Bottoms Profitably Reclaimed<br>*By Brad Mills* | April 6 | 41 |
| Water and Lye Solution Cleans Wells of Paraffin<br>*By L. L. Betchel and William O. Blenkarn* | May 4 | 39 |
| Montebello Lease Includes Many Equipment Conveniences<br>*By Brad Mills* | May. 4 | 76 |
| Progress Made in Study of Pipe Corrosion and Protection<br>*By W. G. Hagen* | May 11 | 29 |
| Old Tank Bottoms Still Have Value<br>*By Wallace Davis* | May 25 | 110 |
| Empire Finds Re-conditioning Old Lines Profitable<br>*By Wallace Davis* | May 25 | 60 |
| Salvage Department Reclaims Used Material at Profit<br>*By Brad Mills* | May 25 | 104 |
| Creosote Retards Ravages of Sulphuric Acid on Tank Roofs<br>*By J. D. Isaacks* | May 25 | 144 |
| Evaporation Losses and Their Reduction<br>*By James H. Westcott* | May 25 | 148 |
| Mud-Hog Pump on Old Log Wagon Is Handy Outfit | June 1 | 28 |
| Takes Real Economy to Make Lease Profitable—It Is | June 8 | 62 |
| Cleaning Plant Makes Obnoxious Gas Useable<br>*By Jack Logan* | July 27 | 148 |
| Inert Gas Used to Reduce Fire Hazard on Tanks<br>*By George Reid* | July 27 | 67 |
| Automatic Flow Device Cuts Lifting Cost on Old Lease<br>*By Wallace Davis* | Oct. 19 | 319 |
| Analyzing Operation First Step in Lease Economy<br>*By A. R. Lewis* | Nov. 16 | 35 |
| **MISCELLANEOUS** | | |
| Pinching Partly Relieves Hendrick Water Trouble<br>*By H. H. King* | Jan. 6 | 41 |
| Handling Congealing Oils in Salt Creek Field<br>*By F. E. Wood, H. W. Young and A. W. Buell* | Jan. 27 | 48 |
| "Swaying Gate Posts" Solve Problem of Getting Shackle Rods Across Road | Feb. 3 | 46 |
| Lightning Rods for Tank Protection<br>*By Wallace Davis* | April 30 | 34 |
| How to Calculate Friction Loss for Flow of Gas in Pipes<br>*By H. L. Kaufman* | May 4 | 58 |
| Trace Teapot Drainage With Dyes in Underground Water | May 18 | 52 |
| Efficiency in Handling Motor Transport Problems<br>*By Wallace Davis* | May 25 | 107 |
| Co-operation Overcomes Pollution Problem at Long Beach<br>*By Brad Mills* | June 1 | 38 |
| Different Explosives Needed for Different Sands<br>*By George Reid* | June 15 | 38 |
| Crude Shippers Make Advances in Rack Construction<br>*By A. R. McTee* | July 27 | 126 |
| Recovery Investigation Report Covered in Engineers Paper | Aug. 24 | 42 |
| Duty of Formation Gas<br>*By Harry Pennington* | Aug. 24 | 48 |
| Operators Under-estimate Damage of Sulphur to Tanks<br>*By J. B. Ray* | Aug. 31 | 89 |
| "Pipe Line Finder" is Device for Locating Buried Lines<br>*By Jack Logan* | Sept. 7 | 43 |
| Use of Twin Steam Engine Brought on Heavy Rotary Equipment—(part one)<br>*By Harry Pennington* | Sept. 7 | 47 |
| The Big Rotary Rig of Today | Sept. 14 | 46 |
| —(parts two and three)<br>*By Harry Pennington* | Sept. 21 | 50 |
| West Texas Operations Bring New Field Practices<br>*By A. S. Field* | Sept. 14 | 31 |
| Engineering Report on Texhoma-Gose Oil Pool, Texas | Sept. 21 | 38 |
| Oil Recovery Was a Science From the Beginning<br>*By George Reid* | Oct. 26 | 53 |
| Increasing Recovery in Northern Appalachian Oil Fields<br>*By Paul D. Torrey* | Oct. 26 | 61 |
| Unit Operation of Delaware Extension Pool, Oklahoma<br>*By I. L. Dunn and James O. Lewis* | Dec. 7 | 60 |

## STANDARDIZATION


| | Date, 1928 | Page |
|---|---|---|
| Results and Advantages of A. P. I. Standard Tool Joints — *By R. A. Wilson* | Jan. 6 | 91 |
| Advantages of A. P. I. Standard Pumping Equipment — *By T. E. Swigart* | Feb. 3<br>Feb. 10 | 51<br>44 |
| A. P. I. Standardization Meeting Set for June 12 to 15 | April 27 | 54 |
| Colorado Springs Standardization Program | June 8 | 32 |
| Method for Appraising Results of Production Control — *By Hallan N. Marsh* | June 15 | 28 |
| Standardization Work Turns to Field Application — *By Spencer W. Robinson* | June 22 | 27 |
| Digest of Semi-Annual Standardization Conference | June 22 | 29 |
| Semi-Annual Standardization Conference Registration List | June 22 | 32 |
| Necessity for Uniform Accounting Instructions and Code — *By C. Y. Colgan* | July 13 | 47 |
| A. P. I. Code on Measuring Field Production Tanks | Aug. 31 | 39 |
| National Standard for Pressure Gauges Proposed | Aug. 31 | 56 |
| A. P. I. to Standardize Crude Measuring and Sampling | Sept. 28 | 66 |


## GEOLOGICAL


| | Date, 1928 | Page |
|---|---|---|
| Ten Years' Application of Air at Hamilton Corners — *By Charles R. Fettke* | Mar. 9 | 27 |
| Program Provides Busy Session for Geologists | Mar. 16 | 41 |
| Engineering Report on Wortham Field, Texas | Mar. 16 | 42 |
| Regional Organization Favored By Geologists — *By Brad Mills* | Mar. 30 | 43 |
| Paleontologists With A. A. P. G. at San Francisco | Mar. 30 | 65 |
| Developments in Southern California Since 1923 — *By Joseph Jensen and Glenn D. Robertson* | April 13 | 31 |
| Exploration in Southwestern Humboldt County, California | May 11 | 54 |
| Gas Sands in the Coastal Plains of Southwest Texas — *By J. B. Best* | May 18 | 58 |
| Development and Production Methods in West Texas — *By Harold Vance* | June 22 | 34 |
| Smith-Ellis Oil Field, Brown County, Texas — *By Willis Storm* | Aug. 3 | 37 |
| Second Edwards Lime Field in Texas (Caldwell County) — *By Richard A. Jones* | Aug. 10 | 34 |
| Structure Favors Oil and Gas Production in New Jersey — *By Alfred C. Hawkins* | Aug. 17 | 28 |
| History and Geology of Latest California Field (Hawthorne-Lawndale) — *By George Elliott* | Sept. 7 | 31 |
| Geologists Will Meet at Fort Worth | Sept. 14 | 54 |
| Big Lake Well Smashes Depth Record — *By H. H. King* | Sept. 14 | 61 |
| Mechanics of Balcones Fault System — *By Richard A. Jones* | Oct. 19 | 306 |
| Los Angeles Geologists Want More Money For Survey | Nov. 9 | 44 |
| Table Showing West Texas Discovery Wells | July 27 | 98 |


## GEOPHYSICAL


| | Date, 1928 | Page |
|---|---|---|
| Geophysical Prospecting Methods Deserve Serious Consideration | Jan. 27 | 33 |
| Electric Methods of Applied Geophysics — *By Dr. Erich Pautsch* | Feb. 24 | 33 |
| Kelso Bayou Dome is Outstanding Seismograph Discovery — *By Jack Logan* | Mar. 2 | 43 |
| Adaptation of Magnet Instruments and Methods to Economic Geology — *By Dr. Erich Pautsch* | July 13<br>July 20 | 48<br>43 |
| Geophysics Reveals Vast Petroleum Deposits in Coast Region — *By Jack Logan* | Nov. 16 | 40 |
| Tabular History of Geophysically Discovered Salt Domes in Texas | Nov. 16 | 42 |
| Tabular History of Geophysically Discovered Salt Domes in Louisiana | Nov. 16 | 44 |


# Features — News — Editorials

## EDITORIALS


| | Date, 1928 | Page |
|---|---|---|
| Waste and Conservation — *By R. L. Dudley* | Jan. 20 | 26 |
| State Co-operation | Mar. 16 | 28 |
| Foreign Opportunities | Mar. 16 | 28 |
| The Producers' Problem — *By R. L. Dudley* | Mar. 16 | 28 |
| Pertinent Market Facts and Figures | Mar. 23 | 38 |
| The Internationalization of Oil — *By R. L. Dudley* | Mar. 30 | 47 |
| The Gas Industry's Problem — *By N. C. McGowan* | May 11 | 28 |
| On the Coming Exposition | May 18 | 32 |
| An Opoprtunity to Reach the Field Man | Sept. 14 | 30 |
| The Exposition at Tulsa | Oct. 12 | 29 |
| Honoring the Old Timers | Oct. 26 | 50 |
| Exposition a Complete Success — *By Grady Triplett* | Nov. 9 | 104 |
| Outside Leadership | Nov. 16 | 28 |
| Executives Plan Production Curtailment by Districts | Dec. 14 | 40 |


## SPECIAL FEATURES

### ECONOMIC SITUATION


| | Date, 1928 | Page |
|---|---|---|
| Wider Markets Suggested As Situation Cure — *By Joseph E. Pogue* | Jan. 13 | 29 |
| Reference to Governmental Control | Jan. 27 | 24 |
| Three-Fourths of World's Production in Last Ten Years — *By A. R. McTee* | Jan. 27 | 26 |
| Nine Hundred Forty Million Barrel Crude Demand | Feb. 17 | 43 |
| New Area Could Further Increase Oklahoma's Production — *By H. J. Struth* | Feb. 17 | 47 |
| The Fable of the Sick Man — *By Wallace Davis* | Feb. 17 | 62 |
| Farish Says Caution Needed During Present Year — *By Arthur Knapp* | Feb. 17 | 166 |
| Economic Significance of West Texas Development — *By C. T. Watson* | Mar. 2 | 31 |
| The Trend of the Petroleum Situation — *By Joseph E. Pogue* | Mar. 2 | 33 |
| An Economic Analysis of the Fuel Oil Situation — *By Arthur Knapp* | Mar. 9 | 25 |
| Stock Situation Reflected in Crude Postings — *By A. R. McTee* | Mar. 16 | 41 |
| America Holds Key to Over-Production, Says Mexican-Eagle Head | April 27 | 34 |
| Review Reveals Depression Largely a Matter of Psychology — *By A. R. McTee* | May 18 | 30 |
| California Has Storage Capacity of 175,000,000 Barrels — *By Brad Mills* | May 25 | 64 |
| Statistics Foreshadow Early Advance in Crude Markets — *By H. J. Struth* | July 27 | 53 |
| The Price of Prosperity in the Petroleum Industry — *By Joseph E. Pogue* | Sept. 21 | 33 |
| Fewer Wells Being Drilled This Year Than in 1927 — *By Brad Mills* | Oct. 12 | 28 |
| Oil Supply, Demand, and Price in 1928 — *By Campbell Osborne* | Oct. 19 | 124 |
| Estimate Shows World Output Slightly Up in 1928 — *By Valentine R. Garfias* | Oct. 19 | 60 |
| Oil Business Should Be Better Organized to Stabilize Production — *By E. B. Reeser* | Dec. 21 | 43 |


### PERSONNEL AND SAFETY


| | Date, 1928 | Page |
|---|---|---|
| Union Oil Company Has Novel Employee Patent Policy Plan | Jan. 13 | 31 |
| Safety First at Lockport — *By Jack Logan* | April 13 | 51 |
| Accidents at Oil Wells Due to Use of Pipe Tools | May 25 | 156 |
| This Type of Field Camp Reduces Labor Turnover | June 8 | 30 |
| Oiling the Machinery of Education — *By A. R. McTee* | June 8 | 40 |
| Mid-West Accident Prevention Gets Results — *By E. H. Denny* | June 8 | 58 |
| West Texas Field Workers Have Livable Surroundings — *By A. R. McTee* | Aug. 31 | 32 |
| Gulf Maintains Model Camp in West Texas | Sept. 7 | 57 |
| Old Man Bonehead | Nov. 16 | 97 |


### OPERATING


| | Date, 1928 | Page |
|---|---|---|
| Reduction of Breathing Losses from Vapor-Tight Lease Tanks — *By Ludwig Schmidt* | Jan. 6 | 37 |
| Sand Production Makes Serious Problem at Coalinga — *By Brad Mills* | Jan. 13 | 41 |
| Cratered Gasser Lowering Pressure in White Point Field — *By Jack Logan* | Feb. 3 | 35 |
| Operating Efficiency Responsible for Record Output — *By A. R. McTee* | Feb. 17 | 45 |
| Sweet Lake Rivals Foreign Fields in Drilling Difficulties — *By Jack Logan* | Mar. 16 | 36 |
| Regular Inspection of Properties Betters Lease Conditions | Mar. 16 | 104 |
| Roxana Drills 61 Producers — One Dry Hole at Chirchill — *By Wallace Davis* | April 13 | 46 |
| One Example of What Happens to Wells When Shut In | April 27 | 60 |
| Providing Chemical Treatment for Petroleum Emulsions — *By Charles W. Cuno* | April 27 | 66 |
| Yount-Lee Spindle Top Operations Substantial and Efficient — *By Jack Logan* | May 18 | 44 |
| Acid Well Would Prevent Sulphur Attack on Tank Bottoms — *By A. C. Holzapfel* | May 25 | 76 |
| Rotary Equipment Keeps Pace With Demands — *By Brad Mills* | July 20 | 28 |
| A Treat For the Map Department — *By Wallace Davis* | July 20 | 39 |
| New Corrosion Resisting Cast Pipe for the Petroleum Industry — *By Gray Morris* | July 20 | 89 |
| Water and Gas Corrosion Combine to Make Work Difficult in West Texas — *By A. R. McTee* | July 27 | 57 |
| Naval Maneuvers Bring Improvement in Handling Fuel — *By G. K. Spencer* | Aug. 3 | 27 |
| Extension Tube Adds Efficiency to Foam Equipment — *By Brad Mills* | Aug. 17 | 40 |


### PERSONALITIES IN THE INDUSTRY


| | Date, 1928 | Page |
|---|---|---|
| How Oil Men Play — Bill (W. H.) Geis Likes to Spend His Spare Time Just Looking at Rocks | Jan. 20 | 36 |

| | Date, 1928 | Page |
|---|---|---|
| How Oil Men Play — G. L. ("Cap") Myer's Well Shooting Replaced Football as His Excitement Source | Jan. 27 | 92 |
| How Oil Men Play — H. B. Longworth | May 4 | 80 |
| How Oil Men Play — Hunting in Off Hours a Diversion Around Seminole | June 8 | 94 |
| Chester F. Kimball Scouted Seminole for Prairie Oil & Gas Company During Big Days | Feb. 3 | 59 |
| Dealing in Personalities *By Grady Triplett* | Feb. 17 | 218 |
| The Cosmopolite Driller *By Wallace Davis* | Mar. 30 | 63 |
| "I Kin Remember" F. M. Kleckner *By Wallace Davis* | April 27 | 102 |
| When Oklahoma Scouts Made Territory With Horses and Buggies *By Wallace Davis* | July 13 | 40 |
| The Game's Greatest Umpire — Ray Collins *By Wallace Davis* | Aug. 10 | 54 |
| Evans Named Old Timers' Host at Tulsa Exposition | Sept. 28 | 36 |
| "Pioneers of the Oil Industry" Formed; James Amm Honored | Nov. 2 | 28 |
| The Osages and Their Oil *By Wallace Davis* | Dec. 21 | 88 |

## GENERAL FEATURES

| | | |
|---|---|---|
| Producers and Pipe Lines Show Wide Use of Radio | Jan. 27 | 30 |
| Production of Oil From Shale By U. S. B. M. (Report to Federal Oil Conservation Board) | Feb. 17 | 204 |
| Winkler County Oils Not As Bad As Their Reputation *By George Reid* | Mar. 16 | 31 |
| Unusual Type of Crude Found in Wyoming *By H. L. Kauffman* | Mar. 16 | 108 |
| The Year's Crude Imports | Mar. 30 | 61 |
| Malaria — a poem | Mar. 30 | 84 |
| Veasey Gives Views on Need for Co-operative Development | April 6 | 27 |
| Tonkawa Has Contributed Much Geological Data *By Wallame Davis* | April 20 | 95 |
| The Cat and the Mice *By Arthur Knapp* | April 27 | 30 |
| Kansas Plant Producing Helium on a Commercial Scale *By Wallace Davis* | May 5 | 60 |
| Little Seminole Needs No Umpire; Ringmaster Would Be Handy *By Wallace Davis* | May 11 | 35 |
| General Principles Covering Tank Design and Construction *By George Horton* | May 25 | 71 |
| Strategy of Fuel Oil Navy Plans *By G. K. Spencer* | May 25 | 77 |
| Government to Extract Helium from Gas in Panhandle | May 25 | 114 |
| Hard to Get and Hard When You Get There | May 25 | 160 |
| Houston Wildcat Golfers Win Marland Cup *By Paul Peebles "Himself"* | June 1 | 40 |
| Sulphur Stages Come-Back; It's Oil Production Now *By Jack Logan* | June 8 | 35 |
| Wildcatting on the Rio Grande Includes War on Rattlers | June 8 | 50 |
| Deep Drilling in Eastern Fields Yields Interesting Data *By J. French Robinson and J. G. Montgomery, Jr.* | June 29 | 37 |
| Tale of a Flag *By George Blardone* | July 6 | 40 |
| Sulphur Crudes Fast Losing Bad Reputation *By George Reid* | July 27 | 63 |
| Wichita Falls Offers Attractive Home for Oil Men | July 27 | 133 |
| Flowing By Heads *By Arthur Knapp* | July 27 | 214 |
| Texas Well Average Shows Increase Over Two-Year Period | Aug. 17 | 38 |
| Flowing By Heads (Second installment) *By Arthur Knapp* | Aug. 31 | 86 |
| It's Good to Have a Millionaire Friend — and Courage *By George Blardone* | Sept. 7 | 96 |
| Oil As a Rain Maker *By Wallace Davis* | Sept. 14 | 57 |
| Exposition Equipment Directory | Oct. 19 | 202 |
| Oil Men Made Their Own Tools When They Needed Them *By Mac O'Reily* | Oct. 26 | 69 |
| Oildom's Shrine *By Grady Triplett* | Oct. 26 | 73 |
| Chemists and Engineers Were Busy Before the First Well *By George Reid* | Oct. 26 | 75 |
| The First Venture in High Explosives (Well Shooting) *By Barr MacMurray* | Oct. 26 | 82 |
| Start of the Supply Business | Oct. 26 | 86 |
| The Oil Fields Break Into Journalism | Oct. 26 | 88 |
| This Is No Ordinary Fish Story | Nov. 9 | 110 |
| An Outsider Would Be a More Forceful Leader (For the A. P. I.) *By Glenn Griswold* | Nov. 16 | 29 |
| Financial Editor Explains Need of Outside Leadership *By Grady Triplett* | Nov. 30 | 30 |
| Expressions Favor Outside Leader for Institute | Nov. 30 | 31 |
| Co-operation and Co-ordination Essential to Industry *By Axtell J. Byles* | Dec. 7 | 49 |

## FINANCIAL

| | | |
|---|---|---|
| New York Oil Company Properties Sold | Jan. 6 | 52 |
| Further Details of New York Oil Company Property Sale | Jan. 20 | 50 |
| Magnolia Extending Purchases of West Texas Oil; Big Contract With Landreth | Jan. 13 | 28 |
| Texas-California Pet's Merger in Process | Jan. 27 | 40 |
| Barnsdall Absorbs Wolfe Oil Corporation | Feb. 3 | 44 |
| Profitable Year Reported By Big Lake Oil Company | Mar. 16 | 96 |
| Gulf Earnings Drop Off During 1927 | April 6 | 28 |
| $3,000,000 Involved in West Texas Deal | May 4 | 42 |
| Lone Star Gas Company Extending System | May 4 | 62 |
| Properties of American Refining Company Sold | May 11 | 40 |
| Moody Buys Interest in Roberts-Chalk Field | June 8 | 39 |
| Roxana Buys Chalk-Roberts Properties | June 15 | 32 |
| New York Oil Company Gas Properties Sold | June 15 | 37 |
| Phillips Petroleum Buys Market Outlet | June 29 | 26 |
| Richfield Becomes Strong Unit Through Merger | June 29 | 27 |
| Corporation Formed for Petroleum Finance | July 6 | 33 |
| Cosden Is Building Refinery to Run Roberts-Chalk Crude | July 20 | 28 |
| Abundant Low Priced Crude Bought Under Long Contracts *By H. H. King* | July 27 | 64 |
| Richfield Stock Offer | July 27 | 212 |
| Mid-West Buys Interest in Hudson Oil Company | Aug. 3 | 56 |
| Gilliland Reorganized | Aug. 10 | 36 |
| Moody-Seagraves Sell Moody Corporation | Oct. 12 | 32 |
| Eastern Capitalists Plan Royalty Deals | Oct. 26 | 38 |
| Change in Financial Methods Benefits Industry *An Interview with Harry H. Rogers* | Nov. 9 | 36 |
| American Maracaibo Company Buys Henshaw Properties | Nov. 30 | 29 |
| Prairie Shareholders Get Stock Dividend | Dec. 7 | 92 |
| S. R. Dresser Company Reorganized and Refinanced | Dec. 14 | 30 |
| Simms Buys Houma Gas Properties; Will Explore for Oil | Dec. 14 | 35 |
| Continental Takes Over Colorado Properties of Union | Dec. 28 | 42 |
| Standard Oil Group Dividends Largest on Record | Dec. 28 | 76 |

## GENERAL NEWS

| | | |
|---|---|---|
| Program Announced for Engineers Meeting at New York (A. I. M. E.) | Feb. 3 | 26 |
| Changes in Marland Staff Start Many Rumors | Feb. 3 | 34 |
| Navy Department Investigating Sale of Naval Reserve Oil to Foreign Company | Feb. 3 | 40 |
| West Texas Petroleum Convention Brings Large Crowd Of Oil Men to San Angelo | Feb. 3 | 41 |
| Panhandle Crude Prices Justified in Commission Report | Feb. 10 | 24 |
| Tulsa Engineers Discuss Air-Gas Lift Problems *By Wallace Davis* | Feb. 10 | 25 |
| W. C. Brower Retires After 40 Years With Vacuum | Feb. 17 | 66 |
| Teapot Dome Deserted | Feb. 17 | 202 |
| Repressuring of Depleted Sands Next Engineering Goal | Mar. 2 | 25 |
| Committee Works Out New Program South of Little River *By Wallace Davis* | Mar. 2 | 39 |
| Cullinan Wants Dictator for Oil Industry | Mar. 2 | 52 |
| Program Provides Busy Session for Geologists | Mar. 16 | 41 |
| Curtailment Idea Spreading in Mid-Continent *By Wallace Davis* | Mar. 23 | 29 |
| Winkler Curtailment Plans Blocked by Crude Contracts *By H. H. King* | Mar. 23 | 30 |
| Seminole Scouts Look Forward to Reunion at Guthrie *By Wallace Davis* | Mar. 23 | 45 |
| Curtailment Committee Will Look Over Contracts | Mar. 30 | 46 |
| Hendrick Production Curtailment Up to Commission *By H. H. King* | April 6 | 25 |
| Restore 60-Cent Royalty Basis for Winkler Royalty | April 6 | 26 |
| Exposition Will Be Held in Tulsa Sometime in September *By Grady Triplett* | April 20 | 26 |
| Commission Orders Proration for Hendrick Field | April 27 | 27 |
| Support Pledged at Tulsa to Stop Drilling Orgy *By Wallace Davis* | April 27 | 29 |
| Invite Commission In on Chalk Field Curtailment *By H. H. King* | April 27 | 31 |
| Sinclair Freed of Teapot Conspiracy Charge | April 27 | 40 |
| Howard County Shut-In Agreement Given Official Sanction | May 4 | 28 |
| Scouts Reorganize Association at Guthrie Meeting | May 4 | 32 |
| Amarillo Preparing for Big Meet of Oil Scouts | May 18 | 46 |
| Guy R. Nicholson Heads National Scouts Association *By George Reid* | May 25 | 47 |
| Yates Proration Order Held Up by Commission | June 15 | 33 |
| Commission Authorizes Hendrick Increase *By H. H. King* | June 15 | 35 |
| Big Consumers Are After West Texas Crude Reserves *By H. H. King* | July 6 | 27 |
| Okmulgee Operators Seek Tariff Protection on Crude | July 20 | 40 |
| A. I. M. E. to Meet at Tulsa During Exposition | July 27 | 170 |
| Price Revision Brightens Outlook in Oklahoma and Kansas *By Wallace Davis* | Aug. 3 | 32 |
| Republican Party Changes Oil Board | Aug. 3 | 29 |
| Oklahoma-Kansas Production Brightest in Year *By Wallace Davis* | Aug. 3 | 33 |
| Commission Limits Output of Chalk-Roberts Field *By H. H. King* | Aug. 10 | 41 |
| Exposition Scientific Division Outlined by Committee | Aug. 24 | 47 |
| Safety Work Has Prominent Place at Tulsa Exposition | Aug. 31 | 38 |
| Statewide Proration Seen as Next Oklahoma Step *By Wallace Davis* | Sept. 14 | 27 |
| Fifth International Petroleum Exposition *By Grady Triplett* | Oct. 19 | 61 |
| Petroleum Exposition Gets Off With Auspicious Start *By Grady Triplett* | Oct. 26 | 27 |
| Scientific Side of Industry Shown Graphically at Tulsa *By George Reid* | Oct. 26 | 28 |
| Five Nations Represented at Fifth Petroleum Congress *By Wallace Davis* | Oct. 26 | 49 |
| Sinclair Stock Rise Basis of Merger Rumors | Nov. 2 | 27 |
| Dan J. Moran Chosen President of Marland Company | Nov. 2 | 27 |
| Tulsa Exposition Surpasses All Previous Efforts *By Grady Triplett* | Nov. 2 | 28 |
| Visitors From Many Nations Attend Exposition | Nov. 2 | 29 |
| Texas Operators Hear Sterling on Gasoline Tax | Nov. 9 | 34 |
| Kansas-Oklahoma Division of Mid-Continent Oil & Gas Association Elects Officers | Nov. 9 | 35 |
| Death Ends Colorful Career of George H. Jones | Nov. 30 | 28 |
| Louisiana-Arkansas Division of Mid-Continent Oil & Gas Association to Widen Activities | Nov. 30 | 42 |
| Royalty Owners Organize; Want A. P. I. Division | Nov. 30 | 52 |
| Robert W. Egan Dies | Dec. 21 | 30 |

| | Date, 1928 | Page |
|---|---|---|
| Tanker Owners Join Movement for Crude Tariff | Dec. 28 | 28 |
| Bureau of Mines Men Organize Alumni Association | Dec. 28 | 48 |


## LAW AND LEGISLATION


| | Date, 1928 | Page |
|---|---|---|
| Tax Decision | Jan. 6 | 54 |
| Court Decree Closes All Mammoth Oil Company Operations | Jan. 6 | 52 |
| Bill Carries $75,000 for Shale Investigation | Jan. 13 | 90 |
| Humble Official Explains Suit on Loading Line | Feb. 10 | 28 |
| Extension Legislation Passes Lower House | Feb. 17 | 186 |
| Bill Makes Radical Changes in Handling Naval Reserve | Mar. 9 | 36 |
| Work Gives Decision in Oil Shale Case | Mar. 9 | 48 |
| New French Oil Law | Mar. 23 | 38 |
| Supreme Court Considers Indian Tax Suit | April 20 | 48 |
| Brazil Plans Oil Land Nationalization | April 27 | 34 |
| Department of Commerce Compiling Oil Laws | May 18 | 34 |
| Gulf Loses Decision in Hendrick Lease Suit | June 8 | 28 |
| Court Ruling Removes Cloud From West Texas Titles | June 29 | 35 |
| Protest Extension of Royalty Oil Contract Made by Fall | Aug. 24 | 44 |
| Court Favors Proration in First Legal Tangle | Sept. 7 | 37 |
| Arkansas Enters Suit for Taxes | Sept. 14 | 64 |
| Louisiana Gravity Tax Decision Appealed to Supreme Court | Sept. 28 | 69 |
| Texas Collects Royalty on Big Lake Gathering Charge | Oct. 12 | 36 |
| Demand for Conservation Makes Sherman Law Obsolete | Nov. 2 | 32 |
| National Legislation Cannot Cure | Nov. 30 | 27 |
| Bill Would Place Dollar a Barrel Tariff on Crude | Dec. 7 | 110 |
| Hearing on Crude Tariff Comes in February | Dec. 14 | 82 |
| Power of Texas Commission to Prorate Gets Court Test | Dec. 28 | 27 |


## PERSONAL PICTURES


| | Date, 1928 | Page |
|---|---|---|
| J. S. Cullinan | Jan. 6 | 28 |
| Manlon E. Layne | Jan. 13 | 86 |
| O. M. Carter | Jan. 13 | 94 |
| Dwight L. Hunter | Jan. 20 | 40 |
| Robert E. Bering | Jan. 27 | 47 |
| Neil G. Lilley | Jan. 27 | 96 |
| William B. Sutton | Feb. 3 | 33 |
| E. R. Brown | Feb. 17 | 65 |
| W. C. Brower | Feb. 17 | 66 |
| Owen A. Thompson | Feb. 17 | 166 |
| Charles R. Bopp | Feb. 17 | 222 |
| James D. Tew | Feb. 17 | 228 |
| A. W. Ambrose | Mar. 2 | 25 |
| C. R. McCollom | Mar. 2 | 26 |
| E. O. Bennett | Mar. 2 | 26 |
| Joseph Jensen | Mar. 2 | 26 |
| Arthur Knapp | Mar. 2 | 27 |
| Lester C. Uren | Mar. 2 | 27 |
| H. W. Camp | Mar. 2 | 27 |
| J. W. Mook | Mar. 9 | 37 |
| John M. Lovejoy | Mar. 16 | 39 |
| F. T. Hopp | Mar. 23 | 40 |
| John N. Strigeoff | Mar. 30 | 60 |
| Roderick Burham | Mar. 30 | 68 |
| R. S. McFarland | April 6 | 38 |
| A. K. Riddle | April 6 | 40 |
| J. E. Elliott | April 13 | 41 |
| W. S. Stapleton | April 13 | 51 |
| W. F. Stoody | April 20 | 31 |
| David Donoghue | April 20 | 45 |
| F. M. Kleckner | April 27 | 102 |
| John L. Rich | April 27 | 47 |
| Harold N. Pardee | May 4 | 27 |
| Adrian Moore | May 4 | 37 |
| R. B. Kelly | May 4 | 37 |
| N. C. McGowan | May 4 | 50 |
| H. C. Morris | May 4 | 51 |
| H. B. Longworth | May 4 | 80 |
| J. D. Creveling | May 11 | 29 |
| H. C. Morris | May 11 | 29 |
| N. C. McGowan | May 11 | 29 |
| Col. M. W. Walsh | May 11 | 29 |
| H. N. Cole | May 11 | 58 |
| R. A. Crawford | May 18 | 40 |
| C. R. Edgecomb | May 23 | 110 |
| J. C. Scanlon | May 25 | 110 |
| C. D. Watson | May 25 | 115 |
| Rex G. Hamaker | June 1 | 35 |
| Guy R. Nicholson | June 1 | 36 |
| J. H. Langston | June 1 | 36 |
| E. J. Bullock | June 8 | 46 |
| William Newport | June 8 | 94 |
| Jim Smith | June 8 | 94 |
| A. M. Bowman | June 15 | 47 |
| Lord Greenway | June 29 | 44 |
| Kenneth H. Sessions | June 29 | 52 |
| Paul N. Boggs | July 6 | 34 |
| R. D. Matthews | July 6 | 34 |
| Harry H. Rogers | July 6 | 40 |
| S. H. Duhig | July 13 | 28 |
| R. M. ("Dick") Young | July 20 | 37 |
| Edgar S. Browning | July 20 | 91 |
| John D. Clark | July 27 | 56 |
| Fred E. Wood | Aug. 3 | 47 |
| Ray Collins | Aug. 10 | 54 |
| Clyde M. Bennett | Aug. 24 | 30 |
| Trell W. Yocum | Aug. 24 | 46 |
| Ralph L. Morton, Jr. | Aug. 24 | 46 |
| J. S. Ross | Aug. 24 | 46 |
| Sam Grinsfelder | Aug. 31 | 36 |
| C. E. Richards | Sept. 7 | 58 |
| Allmand M. Blow | Sept. 14 | 65 |
| D. W. Harris | Sept. 21 | 48 |
| J. H. Evans | Sept. 28 | 36 |
| P. F. Shannon | Sept. 28 | 39 |
| U. deB Daly | Oct. 5 | 30 |
| F. Godber | Oct. 5 | 30 |
| Charles B. Scott | Oct. 5 | 32 |
| Harry C. Fowler | Oct. 5 | 32 |
| Thomas R. Weymouth | Oct. 5 | 33 |
| W. G. Skelly | Oct. 5 | 34 |
| C. C. Herndon | Oct. 5 | 34 |
| Officers and Directors of American Petroleum Institute | Oct. 19 | 64 |
| C. E. Beecher | Oct. 19 | 66 |
| A. W. Ambrose | Oct. 19 | 66 |
| M. J. Kirwan | Oct. 19 | 66 |
| Oscar Fogg | Oct. 19 | 240 |
| B. J. Mullaney | Oct. 19 | 240 |
| G. B. Cortelyou | Oct. 19 | 240 |
| H. O. Caster | Oct. 19 | 240 |
| T. U. McCarter | Oct. 19 | 240 |
| R. Otis McClintock | Oct. 19 | 251 |
| J. Burr Gibbons | Oct. 26 | 42 |
| Harry H. Rogers | Nov. 9 | 37 |
| Leonard M. Fanning | Nov. 16 | 39 |
| H. J. Struth | Nov. 23 | 27 |
| Reed Alsobrook | Nov. 23 | 34 |
| George H. Jones | Nov. 30 | 28 |
| L. H. Prichard | Nov. 30 | 49 |
| E. B. Reeser | Dec. 7 | 43 |
| K. R. Kingsbury | Dec. 14 | 41 |
| E. B. Reeser | Dec. 14 | 42 |
| Jacques Vinmont | Dec. 14 | 51 |


# Field Development and Exploration

## PROVEN FIELDS AND EXTENSIONS

### MOUNTAIN STATES


| | Date, 1928 | Page |
|---|---|---|
| Colorado Production By Years and By Districts | Feb. 17 | 129 |
| Colorado Completions By Fields, 1926-1927 | Feb. 17 | 132 |
| Montana Production By Districts By Years, 1916-1927 | Feb. 17 | 129 |
| Montana Completions, 1926-1927 | Feb. 17 | 132 |
| New Mexico Completions By Fields, 1926-1927 | Feb. 17 | 132 |
| Wyoming Production By Districts By Years, 1894-1927 | Feb. 17 | 127 |
| Wyoming Completions, 1926-1927 | Feb. 17 | 131 |
| Utah Completions By Fields, 1926-1927 | Feb. 17 | 132 |
| Production in the Rocky Mountain Area<br>*By S. H. Keoughan* | Dec. 7 | 58 |
| Mountain States Field Development Notes | Jan. 6 | 52 |
| Mountain States Field Development Notes | Jan. 13 | 46 |
| Mountain States Field Development Notes | Jan. 20 | 50 |
| Mountain States Field Development Notes | Jan. 27 | 51 |
| Mountain States Field Development Notes | Feb. 3 | 50 |
| Mountain States Field Development Notes | Feb. 10 | 38 |
| Mountain States Field Development Notes | Feb. 17 | 165 |
| Mountain States Field Development Notes | Mar. 2 | 58 |
| Mountain States Field Development Notes | Mar. 9 | 54 |
| Mountain States Field Development Notes | Mar. 16 | 54 |
| Mountain States Field Development Notes | Mar. 23 | 58 |
| Mountain States Field Development Notes | Mar. 30 | 102 |
| Mountain States Field Development Notes | April 6 | 50 |
| Mountain States Field Development Notes | April 13 | 60 |
| Mountain States Field Development Notes | April 20 | 47 |
| Mountain States Field Development Notes | April 27 | 64 |
| Mountain States Field Development Notes | May 4 | 44 |
| Mountain States Field Development Notes | May 11 | 60 |
| Mountain States Field Development Notes | May 18 | 48 |
| Mountain States Field Development Notes | June 1 | 48 |
| Mountain States Field Development Notes | June 22 | 60 |
| Mountain States Field Development Notes | June 29 | 50 |
| Mountain States Field Development Notes | July 6 | 96 |
| Mountain States Field Development Notes | July 13 | 46 |
| Mountain States Field Development Notes | July 20 | 56 |
| Mountain States Field Development Notes | Aug. 3 | 50 |
| Mountain States Field Development Notes | Aug. 10 | 50 |
| Mountain States Field Development Notes | Aug. 31 | 54 |
| Mountain States Field Development Notes | Sept. 7 | 56 |
| Mountain States Field Development Notes | Oct. 5 | 56 |
| Mountain States Field Development Notes | Oct. 26 | 41 |
| Mountain States Field Development Notes | Nov. 9 | 62 |
| Mountain States Field Development Notes | Nov. 30 | 53 |
| Mountain States Field Development Notes | Dec. 14 | 52 |


### OKLAHOMA


| | Date, 1928 | Page |
|---|---|---|
| Seminole— | | |
| Seminole Production Goes Down With Thermometer<br>*By Wallace Davis* | Jan. 6 | 45 |
| Seminole Output Climbs With Moderate Weather<br>*By Wallace Davis* | Jan. 13 | 33 |
| Water Showing Reduces Seminole Extension Threat<br>*By Wallace Davis* | Jan. 27 | 35 |
| Seminole Curtailment Plan Extended to April 1<br>*By Wallace Davis* | Feb. 3 | 37 |
| Seminole Holding Above 320,000 Barrels Daily<br>*By Wallace Davis* | Feb. 17 | 59 |
| Seminole Down 15,000 Barrels in Six Days<br>*By Wallace Davis* | Feb. 24 | 24 |
| Seminole Development Activity Decline Checked<br>*By Wallace Davis* | Mar. 9 | 35 |
| Seminole Recovers After Going Below 300,000 Barrels Daily<br>*By Wallace Davis* | Mar. 16 | 49 |

| | Date, 1928 | Page |
|---|---|---|
| Seminole Well Average Declines Six Barrels During Week | Mar. 30 | 42 |
| *By Wallace Davis* | | |
| Re-conditioning Seminole Wells Increases Output | April 13 | 43 |
| *By Wallace Davis* | | |
| Seminole Runs to Storage 10,000 Barrels Daily | April 27 | 39 |
| *By Wallace Davis* | | |
| Greater Seminole Reaches Low Production Mark | June 15 | 43 |
| Greater Seminole Production Substantially Up | Aug. 10 | 37 |
| *By Wallace Davis* | | |
| Test Flow Runs Seminole Output to New High For Year | Sept. 21 | 29 |
| *By Wallace Davis* | | |
| Greater Seminole Decline Gives Light Oil Strength | Nov. 16 | 31 |
| *By Wallace Davis* | | |
| Greater Seminole Output Reaches New Low Level | Dec. 14 | 33 |
| *By Warren Baker* | | |
| Greater Seminole Production Off Despite Maud Increase | Dec. 21 | 30 |
| **Little River—** | | |
| Little River Agreement Extended to June 15 | April 20 | 39 |
| *By Wallace Davis* | | |
| Little River Due for Quick Decline From New Peak | May 25 | 46 |
| *By Wallace Davis* | | |
| Last of Little River Test Wells Is the Best | June 1 | 33 |
| *By Wallace Davis* | | |
| Little River Decline Brings Seminole Total Down | June 8 | 31 |
| Big Drilling Campaign Starts in South Little River | June 22 | 50 |
| *By Wallace Davis* | | |
| Little River Drilling Rush Getting Under Way | June 29 | 28 |
| *By Wallace Davis* | | |
| Little River East Prospect Shows Failure | July 6 | 35 |
| *By Wallace Davis* | | |
| Remove Restrictions on Drilling at Little River | July 20 | 29 |
| Big Drilling Campaign Under Way in South Little River | July 27 | 163 |
| *By Wallace Davis* | | |
| Little River Restrictions Off; Production Jumps | Aug. 17 | 32 |
| *By Wallace Davis* | | |
| South Little River and St. Louis Increase Rapidly | Aug. 24 | 33 |
| *By Wallace Davis* | | |
| Little River Field Hits 129,204 Barrels on Open Flow | Sept. 14 | 29 |
| *By Wallace Davis* | | |
| Little River Production Rises With Wells on Air | Oct. 12 | 34 |
| *By Wallace Davis* | | |
| **St. Louis—** | | |
| St. Louis Pool Promises Prolific Area | July 13 | 37 |
| *By Wallace Davis* | | |
| St. Louis Field Due to Get Thorough Development | Aug. 17 | 32 |
| St. Louis Pool Reaches New Production Peak | Aug. 31 | 27 |
| *By Wallace Davis* | | |
| "Dead" Wells Cast New Outlook on St. Louis | Sept. 7 | 37 |
| Air Application Raises St. Louis to New Production Peak | Sept. 28 | 37 |
| *By Wallace Davis* | | |
| Water Troubles Delay Activities in St. Louis Area | Oct. 5 | 27 |
| *By Wallace Davis* | | |
| Salt Water Gradually Encroaching Upon St. Louis Wells | Oct. 12 | 35 |
| *By Wallace Davis* | | |
| Wilcox Pinches Out East of St. Louis; Maud Active | Oct. 26 | 29 |
| *By Wallace Davis* | | |
| St. Louis Offers New Threat With Mile Extension | Dec. 28 | 32 |
| *By Warren Baker* | | |
| **Oklahoma General—** | | |
| Bowlegs Extension and Logan County Offer Threats | Jan. 20 | 37 |
| *By Wallace Davis* | | |
| New Areas Added to Take Up Seminole Decline | Feb. 10 | 30 |
| *By Wallace Davis* | | |
| Oklahoma Completions by Fields for 1926, 1927 | Feb. 17 | 140 |
| Oklahoma Production by Fields for 1926-1927 | Feb. 17 | 140 |
| Pottawatomie Showing Symptoms of Big Production | Mar. 23 | 46 |
| *By Wallace Davis* | | |
| Pearson-St. Louis-Allen Pools "Hot Spots" in Oklahoma | April 6 | 29 |
| *By Wallace Davis* | | |
| Earlsboro Unruly as Extensions Promise New Drilling | Sept. 7 | 35 |
| *By Wallace Davis* | | |
| Commission Order Fails to Lower Oklahoma Output | Sept. 28 | 27 |
| *By Wallace Davis* | | |
| Seek Raise of Oklahoma Proration to 750,000 Barrels Daily | Oct. 12 | 27 |
| Raise Mission-Maud Restrictions During November | Oct. 19 | 244 |
| *By Wallace Davis* | | |
| Many Locations Made in Mission Area; To Spud November 15 | Oct. 26 | 29 |
| Sharp Decline Makes Oklahoma Situation Look Better | Nov. 2 | 33 |
| *By Wallace Davis* | | |
| Oklahoma Production Rallies After Decline | Nov. 9 | 29 |
| *By Wallace Davis* | | |
| Maud Field Extended by Hunton Lime Well | Nov. 16 | 32 |
| Oklahoma Flush Wells Show Tendency to Weaken | Nov. 23 | 31 |
| *By Wallace Davis* | | |
| Operations Will Delay Drilling in Mission Area | Dec. 21 | 29 |
| Propose to Drill Oklahoma City Well Deeper to Wilcox Sand | Dec. 21 | 31 |
| *By Warren Baker* | | |
| Drilling for Deep Oil in Allen Field Has Its Attractions | Dec. 28 | 34 |
| **KANSAS** | | |
| Kansas Production by Fields and Counties, 1926-1927 | Feb. 17 | 142 |
| Kansas Completions by Fields and Counties, 1926-1927 | Feb. 17 | 142 |
| Lost Springs Development Assumes Boom Proportions | Mar. 9 | 38 |
| *By Wallace Davis* | | |
| Recent Developments Give Kansas New Importance as Reserve | Nov. 9 | 25 |
| *By Wallace Davis* | | |
| Second Producer Establishes New Kansas Area (Sedgwick) | Nov. 30 | 37 |
| *By Wallace Davis* | | |
| Sedgwick County Well Flows 5000-7000 Barrels | Dec. 7 | 96 |
| Sedgwick County Production Coming From Chat Formation | Dec. 14 | 28 |
| Sedgwick County Extension North Indicated by Producer | Dec. 28 | 34 |
| **TEXAS** | | |
| **Texas General—** | | |
| Deep Production Search Widespread Over Texas | Jan. 20 | 42 |
| *By H. H. King* | | |
| Texas Production By Fields By Years, 1896-1927 | Feb. 17 | 123 |
| Texas Completions By Fields, 1926-1927 | Feb. 17 | 134 |
| Boggy Creek Tests Active | Sept. 21 | 40 |
| Moore and Gray Counties Boost Panhandle Production | Nov. 2 | 36 |
| Storage Withdrawals in Texas Panhandle Halted in November | Dec. 21 | 28 |
| **West Texas—** | | |
| **General** | | |
| Bargains Offered West Texas Crude Buyers | Jan. 13 | 27 |
| Provide Storage for Excess Crude in West Texas | Feb. 24 | 19 |
| *By H. H. King* | | |
| Gauge Shows West Texas Potential 3,187,395 Barrels | July 6 | 32 |
| *By H. H. King* | | |
| Chalk-Roberts Operators Want Revision of Proration Rule | Oct. 19 | 248 |
| Dearth of Tankage Delays Opening of Chalk-Roberts Pool | Aug. 17 | 29 |
| *By H. H. King* | | |
| Record Deep Well in Reagan County Flows Oil and Gas | Dec. 7 | 90 |
| *By H. H. King* | | |
| Howard County Operators Agree to Shut-in Wells | Feb. 10 | 26 |
| *By H. H. King* | | |
| Roberts-Chalk Field Restrictions to Be Modified | June 29 | 31 |
| Favor Holding Roberts-Chalk Field to 50 Per Cent | July 20 | 27 |
| **Yates—** | | |
| Yates Field Well Average Limited to 350 Barrels | Feb. 10 | 22 |
| Big Producers Send Yates Field to New Peak | Mar. 2 | 41 |
| *By H. H. King* | | |
| Yates Prorated to 275 Barrels Per Well During May | May 4 | 31 |
| Yates Field Operators Start Big Drilling Campaign | June 22 | 48 |
| Yates Field Makes New High Production Show | Aug. 31 | 30 |
| *By H. H. King* | | |
| Yates Pool Potential Now 3,425,923 Barrels | Sept. 14 | 39 |
| *By A. R. McTee* | | |
| **Winkler—** | | |
| Winkler County Crude Storage Costs (on a four-year basis) | Mar. 23 | 32 |
| Winkler County Development Costs Per 80-acre, Eight-well Lease | Mar. 23 | 32 |
| "Law of Offsets" Rushing Work in Winkler County | Mar. 23 | 42 |
| *By H. H. King* | | |
| Winkler County Completions Add 190,000 Barrels During Week | Aug. 10 | 43 |
| *By H. H. King* | | |
| Winkler County Operators Ready for Llano Shut-Down | Aug. 17 | 30 |
| *By H. H. King* | | |
| Second Winkler County Area Due Active Drilling | Oct. 19 | 246 |
| *By H. H. King* | | |
| Winkler County Output Increased to 175,000 Barrels | Dec. 28 | 33 |
| *By H. H. King* | | |
| **Hendrick—** | | |
| Pinching Partly Relieves Hendrick's Water Trouble | Jan. 6 | 41 |
| Peculiar Water Trouble Develops in Hendrick Field | Jan. 13 | 37 |
| *By H. H. King* | | |
| Hendrick Field Reaches New Production Peak | Jan. 20 | 39 |
| *By H. H. King* | | |
| Water Intrusion Hurries Work in Hendrick Field | Feb. 3 | 31 |
| *By H. H. King* | | |
| Hendrick Field Reaches New Peak | Feb. 17 | 57 |
| *By H. H. King* | | |
| Hendrick Field Production at New Peak | Feb. 24 | 29 |
| *By H. H. King* | | |
| Hendrick Extension Starts Big Offset Campaign | Mar. 9 | 40 |
| *By H. H. King* | | |
| Large Hendrick Production Makes Curtailment Imperative | Mar. 16 | 44 |
| *By H. H. King* | | |
| Table of Hendrick Crude Contracts, Giving Buyer, Seller and Amount | Mar. 23 | 31 |
| Third Big Producer in Hendrick North Extension | Mar. 30 | 45 |
| *By H. H. King* | | |
| Rush Hendrick Locations While Proration Delays | April 13 | 39 |
| *By H. H. King* | | |
| Operators Rush Wells in Hendrick Flush Area | April 20 | 41 |
| *By H. H. King* | | |
| North End Wells Send Hendrick to New Peak | April 27 | 41 |
| *By H. H. King* | | |
| Hendrick Wells Showing Water in Increasing Quantity | May 4 | 29 |
| *By H. H. King* | | |
| Production Rush Precedes Hendrick Proration Enforcement | May 11 | 27 |
| *By H. H. King* | | |
| Hendick Shut-In Program Lessens Water Danger | May 11 | 39 |
| *By H. H. King* | | |
| Gauge Shows Hendrick Potential 643,973 Barrels Daily | May 18 | 39 |
| *By H. H. King* | | |
| Hendrick Production Area Now Six Miles Long | May 25 | 48 |
| Expect Committee to Recommend Hendrick Increase | June 1 | 37 |
| *By H. H. King* | | |
| Committee Seeks to Increase Hendrick Runs | June 8 | 34 |
| *By H. H. King* | | |
| Hendrick Prorated Output Increased to 175,000 Barrels Daily | June 22 | 47 |
| *By H. H. King* | | |
| Hendrick Field Activity Reaches New Peak | July 13 | 27 |
| *By H. H. King* | | |

| | Date, 1928 | Page |
|---|---|---|
| Hendrick Field Drilling Due to Slow Down. *By H. H. King* | July 20 | 35 |
| Hendrick Field Shows First Decline on Production Test. *By H. H. King* | Oct. 5 | 29 |
| Extension Gives Hendrick Field Three Mile Width. *By H. H. King* | Oct. 26 | 33 |
| Hendrick Mid-section Yields Large Completions | Dec. 14 | 29 |
| **North Texas—** | | |
| Wilbarger County Makes Big Production Gain | July 20 | 48 |
| Wilbarger Production Is Above Handling Facilities | July 27 | 32 |
| Prolific Wilbarger Production Extended; Seeking Lines | Aug. 3 | 36 |
| Mounting Production Forces Wilbarger Proration | Aug. 10 | 44 |
| Greyback Pool Active in North Texas Area | Sept. 14 | 40 |
| New Production Level in K-M-A Field | Dec. 14 | 34 |
| **TEXAS AND LOUISIANA GULF COAST** | | |
| Deep Coastal Producer Flows 1100 Barrels on Test. *By Jack Logan* | Jan. 13 | 36 |
| Dozen Gulf Coast Completions Near 1000-Barrel Average. *By Jack Logan* | Jan. 27 | 41 |
| Coastal Output Shows Steady Drop From Spindle Top High Figure. *By Jack Logan* | Feb. 3 | 48 |
| New Production Record Established in Gulf Coast (1927 Review). *By Jack Logan* | Feb. 17 | 73 |
| Gulf's Sorrento Dome Well Flows 5000 Barrels. *By Jack Logan* | Feb. 24 | 26 |
| Kelso Bayou Production Increased to 3500 Barrels Daily. *By Jack Logan* | May 4 | 36 |
| Fifth Well Completed on Kelso Bayou Dome. *By Jack Logan* | May 11 | 45 |
| Hull Production Lower Than First of the Year | May 25 | 146 |
| Bulk of New Oil in Gulf Coast Furnished by Louisiana. *By Jack Logan* | June 15 | 39 |
| South Louisiana Output Doubled Since First of Year. *By Jack Logan* | June 29 | 41 |
| Gulf Coast Production Down With Few Completions. *By Jack Logan* | July 6 | 48 |
| New Wells Boost Gulf Coast Average. *By Jack Logan* | July 13 | 41 |
| Deep Pay at Jennings May Start Real Drilling Campaign | Aug. 3 | 46 |
| Deep Well at Jennings Holding Original Flow. *By Jack Logan* | Aug. 10 | 48 |
| Sand at Greater Depth Extends Production at Markham | Aug. 24 | 32 |
| Barbers Hill Gets an Oil Well After Years of Effort. *By Jack Logan* | Oct. 12 | 31 |
| Best Part of Kelso Bayou Field Yet to Be Drilled | Nov. 9 | 40 |
| East Hackberry Extended Mile Into Calcasieu Lake | Nov. 16 | 33 |
| Developments in Gulf Coast Fields | Sept. 21 | 39 |
| Developments in Gulf Coast Fields | Sept. 28 | 46 |
| Developments in Gulf Coast Fields | Oct. 5 | 31 |
| Developments in Gulf Coast Fields | Nov. 2 | 50 |
| Developments in Gulf Coast Fields | Nov. 9 | 40 |
| Developments in Gulf Coast Fields | Dec. 7 | 98 |
| Developments in Gulf Coast Fields | Dec. 14 | 35 |
| Developments in Gulf Coast Fields | Dec. 28 | 40 |
| **CALIFORNIA** | | |
| **California General—** | | |
| California Production Increase Not Materializing. *By Brad Mills* | Jan. 13 | 43 |
| New Sand Centers Interest at Seal Beach. *By Brad Mills* | Jan. 27 | 43 |
| California Fields Have Quiet Period. *By Brad Mills* | Feb. 3 | 39 |
| 1927-California-1928—Review and Forecast. *By Brad Mills* | Feb. 17 | 69 |
| California Petroleum Production by Fields, 1876-1927 | Feb. 17 | 119 |
| California Completions by Fields, 1926-1927 | Feb. 17 | 138 |
| Propose Curtailment of California Production. *By Brad Mills* | Feb. 24 | 27 |
| California Stock Report Helps Curtailment. *By Brad Mills* | Mar. 2 | 59 |
| Curtailment Move Stabilizes California Situation. *By Brad Mills* | March 23 | 56 |
| New Discoveries Feature Week in California. *By Brad Mills* | Aug. 3 | 51 |
| California Operators Fear Effect of Santa Fe Springs. *By Brad Mills* | Aug. 31 | 50 |
| Deep Production in Midway Field Has Important Possibilities | Oct. 19 | 260 |
| Much Sought Oil Zone Found in Two Wells at Elwood | Nov. 2 | 38 |
| **Long Beach—** | | |
| Raise Estimates on Deep Sand at Long Beach. *By Brad Mills* | Jan. 6 | 43 |
| Long Beach Making Good on Production Threat. *By Brad Mills* | March 9 | 49 |
| Six New Wells Boost Production at Long Beach. *By Brad Mills* | March 30 | 97 |
| Long Beach Will Not Have Quick Decline. *By Brad Mills* | April 6 | 51 |
| Long Beach Rise Offsets California Shut-in Program. *By Brad Mills* | April 13 | 54 |
| Long Beach Producers Killed in Effort to Get Bigger Flow. *By Brad Mills* | April 20 | 37 |
| Long Beach Should Reach 225,000 Barrel Peak by July. *By Brad Mills* | May 4 | 33 |
| Long Beach Production Raised 5000 Barrels. *By Brad Mills* | May 11 | 51 |
| Long Beach Production Increase Slow Process. *By Brad Mills* | May 18 | 41 |
| Long Beach Production Raised to 190,000 Barrels. *By Brad Mills* | May 25 | 49 |
| Long Beach Reaches 200,000 Barrel Daily Output. *By Brad Mills* | June 1 | 42 |
| Long Beach Makes New High Production Record | June 8 | 52 |
| New Wells Scarcely Overcome Long Beach Decline | June 15 | 48 |
| Long Beach Production Climb Halted Around 200,000 Barrels. *By Brad Mills* | June 22 | 51 |
| Long Beach Peak Apparently Has Been Reached. *By Brad Mills* | June 27 | 43 |
| Long Beach Showing Unmistakable Signs of Faltering. *By Brad Mills* | July 6 | 41 |
| Long Beach Stages Come-back After Slump. *By Brad Mills* | July 13 | 43 |
| Long Beach Wells Holding Near Initial Output. *By Brad Mills* | July 27 | 156 |
| Long Beach Development Sets New Records. *By Brad Mills* | Aug. 10 | 30 |
| Long Beach Will Be Critical Factor for Some Time. *By Brad Mills* | Sept. 14 | 37 |
| Long Beach Production Climbs to 212,000 Barrels. *By Brad Mills* | Sept. 21 | 35 |
| **Santa Fe Springs—** | | |
| Rush On for Deep Zone at Santa Fe Springs. *By Brad Mills* | Aug. 10 | 39 |
| Talk Plans for Curbing Santa Fe Springs as Rush Continues. *By Brad Mills* | Aug. 17 | 36 |
| Rush Drilling of Deep Wells at Santa Fe Springs. *By Brad Mills* | Aug. 24 | 39 |
| Unable to Check Drilling Rush at Santa Fe Springs. *By Brad Mills* | Sept. 7 | 34 |
| Two Wells Reveal Location of New Deep Sand at Santa Fe Springs. *By Brad Mills* | Sept. 28 | 67 |
| Final Completion of Two Deep Wells at Santa Fe Springs Is Delayed. *By Brad Mills* | Oct. 5 | 37 |
| Shell Company's Buckbee Well Makes Good Showing. *By Brad Mills* | Oct. 12 | 41 |
| Failure to Find Buckbee Causes Operators Concern. *By Brad Mills* | Oct. 19 | 256 |
| Show Down on What Santa Fe Springs Will Do Due Shortly. *By Brad Mills* | Oct. 26 | 39 |
| Burning Santa Fe Springs Well Making 4300 Barrels. *By Brad Mills* | Nov. 2 | 37 |
| Peak of 300,000 Barrels Seen for Santa Fe Springs. *By Brad Mills* | Nov. 9 | 41 |
| Buckbee Zone May Fall Short of Early Estimates. *By Brad Mills* | Nov. 16 | 50 |
| Buckbee Zone Regains Standing With Good Completion. *By Brad Mills* | Nov. 23 | 35 |
| Indicated Limits of Buckbee Zone Portends Quick Decline. *By Brad Mills* | Nov. 30 | 39 |
| Intermediate Zone Major Factor at Santa Fe Springs. *By Brad Mills* | Dec. 7 | 106 |
| Santa Fe Springs Intermediate Zone Given High Rating. *By Brad Mills* | Dec. 14 | 31 |
| Buckbee Zone Showing Effects of Drainage. *By Brad Mills* | Dec. 21 | 33 |
| Rate of Decline Makes Buckbee Sand Less Attractive. *By Brad Mills* | Dec. 28 | 37 |
| **NORTH LOUISIANA-ARKANSAS** | | |
| **Champagnolle—** | | |
| Two Flowing Wells Added in Champagnolle District During Week | Jan. 6 | 54 |
| Champagnolle Looks Like Real Field | Jan. 13 | 46 |
| Champagnolle Failure Condemns Extension Possibilities Except to South | Jan. 20 | 44 |
| Four Completions Strengthen Champagnolle Prospects | Feb. 10 | 40 |
| Champagnolle Activity Approaches Boom Proportions | May 5 | 43 |
| Third Champagnolle Completion Largest in Field | May 11 | 46 |
| Champagnolle Production Boosted to Above 30,000 Barrels | June 8 | 54 |
| Champagnolle Producing Area Extended Mile | June 15 | 50 |
| Champagnolle Operations Reach Boom Proportions | June 29 | 33 |
| Completions Slow Despite Much Testing at Champagnolle | July 20 | 50 |
| Three Good Producers Added in Champagnolle Area | July 27 | 55 |
| Fourth Producing Sand Tested at Champagnolle | Aug. 3 | 54 |
| Champagnolle Has Two Good Wells in Extension | Aug. 24 | 43 |
| Extension of Champagnolle Area Gets Setback | Aug. 31 | 52 |
| Champagnolle Interest Shifts to Western Edge | Sept. 21 | 41 |
| Gasser Links Up Production Spots in Champagnolle Area. *By W. W. Moore* | Sept. 28 | 70 |
| Three Champagnolle Edge Wells Come In As Producers. *By W. W. Moore* | Oct. 5 | 50 |
| Champagnolle May Center East of Discovery Well | Oct. 19 | 252 |
| Champagnolle Area Has Active Drilling Campaign Under Way | Oct. 26 | 44 |
| Two Champagnolle Completions on Northwest and Northeast | Nov. 2 | 40 |
| Sand at 2600 Feet in Champagnolle May Be Graves Formation | Dec. 28 | 60 |
| **Cotton Valley—** | | |
| Trinity Produces 3000-Barrel Well at Cotton Valley | March 30 | 100 |
| Ohio Has Good Flow High Gravity Oil at Cotton Valley | April 6 | 39 |
| Ten Locations Staked Around Wells at Cotton Valley | April 13 | 45 |
| Trinity at Cotton Valley Still Has Operators Guessing | May 18 | 46 |
| Two Producers Completed in Trinity at Cotton Valley | July 13 | 36 |
| Cotton Valley Has Another Week of Disappointments | July 20 | 54 |
| Third Trinity Sand Producer at Cotton Valley | Aug. 3 | 44 |

Date, 1928 Page

Three Gas Wells Completed in Trinity at Cotton Valley..Oct. 12 42
*By W. W. Moore*
General: (Note—Articles listed under "Champagnolle" and "Cotton Valley" usually include a review of other important happenings in the North Louisiana-Arkansas district for the week.)
Two Louisiana Wells Reach Depths Below 6000 Feet..Feb. 3 43
Louisiana-Arkansas Area Declined Steadily During 1927..Feb. 17 78
*By L. R. Saunders*
Drilling Revival in Louisiana-Arkansas Area .....March 16 51
*By Staff Representative*
Recent Strikes Promise Drilling Campaigns for Louisiana Arkansas .....April 20 42
Strong Gas Show in Lower Trinity at Pine Island....Nov. 9 60
Panola Well Makes 144 Barrels Oil With Spray of Gas..Nov. 23 75

## WILDCATS

### TEXAS

**Texas Gulf Coast—**

Wildcats Feature Gulf Coast Activity.....Feb. 10 29
*By Jack Logan*
South Liberty Extended to Northwest.....March 2 40
Mile Extension Revives Work at South Liberty.....March 9 56
*By Jack Logan*
Well in New Coastal Pool Pinched in Pending Line Completion .....April 6 31
*By Jack Logan*
High Island Well Flows 1200 barrels.....June 29 40
Seismograph Showing Gets Drilling Test in Harris County .....Aug. 24 31
*By Jack Logan*
Sand At Greater Depth Extends Production at Markham .....Aug. 24 32
Double Salt Dome Latest Discovery in Gulf Coast.....Aug. 31 35
Coastal Wildcat Failures During Week Outnumber Wells Aug. 31 37
*By Jack Logan*
Deep Pay Rewards Drilling Efforts at Raccoon Bend....Sept. 7 38
*By Jack Logan*
Humble Plans to Handle Raccoon Bend Output.....Sept. 14 42
*By Jack Logan*
Barbers Hill Gets an Oil Well After Years of Effort....Oct. 12 31
*By Jack Logan*
Austin County Well Develops Unusual Gas Flow.....Nov. 30 35
*By Jack Logan*
Gulf Proves Long Point Dome, Fort Bend County.....Dec. 31 46
See also "Developments in Gulf Coast Fields" under "Proven Fields and Extensions"

**Southwest Texas—**

New Production Between Luling and Dale.....May 4 42
Gonzales County Wildcat Makes 500 Barrels.....Dec. 28 28
Sun Opens Three Fields in Fault and Upper Coast Region .....Oct. 19 254

**North and Central Texas—**

New Pool East of Fry District.....Jan. 20 43
Wildcat Strikes Stimulate Work in North Texas District.Mar. 9 44
Shallow Oil Producer in Shackelford County.....June 1 50
Haskell County Wildcat Quits Flow; 145 Barrels on Swab .....Oct. 12 33

**Panhandle—**

Jones County Well Swabs 70 Barrels in 12 Hours.....Feb. 3 32
Texas Panhandle Wildcat Makes Heavy Flows.....Mar. 30 46
Interest Revived in Jones County Wildcat.....June 1 28

**West Texas—**

Winkler County Wildcat Heralds Pool of Major Type....May 18 27
*By H. H. King*
Dozen New Prospective Fields Found in West Texas...July 27 94
*By H. H. King*
Most West Texas Wildcats Failures During Recent Months .....July 27 105
*By H. H. King*
West Texas Dry-hole Record for Past 12 Months, Tabular Form .....July 27 107
Culberson County Producer Marks 50-Mile Extension...Aug. 3 35
*By H. H. King*
Possibility of Field In Menard County Looms With Oil Show .....Sept. 7 44
Several West Texas Wildcats Indicate New Production..Sept. 14 40
New Area Opened Five Miles Southeast of Hendrick Field .....Sept. 21 31
*By H. H. King*
South Winkler Gasser Attracts Three Offsets.....Sept. 28 40
*By H. H. King*
Three Wildcats in Yates Area Show Possibilities.....Nov. 2 35
*By H. H. King*
Ward County Wildcat Opens New West Texas Area...Nov. 9 31
Outside Producer Starts Drilling Rush South of Hendrick Field .....Nov. 16 27
*By H. H. King*
Second Test in O'Brien Area Fails at Expected Depth..Nov. 23 33
*By H. H. King*
Pecos County Wildcat Opens New Potential Shallow Pool .....Nov. 30 36
*By H. H. King*
Wildcat Development in Pecos County Encourages Drilling .....Dec. 21 38

### KANSAS

Bulk of Kansas Activities Centered in Six Counties....June 15 46
New Production Area Opened in Marion County, Kansas .....Oct. 12 36
Offsetting Starts Around Kansas Wildcat Strike.....Oct. 26 30
Kansas Drilling Campagn Gets Another Boost in Ellis County .....Nov. 16 34
Start Tests Near Goodrich Strike in Kansas.....Dec. 21 32
See also weekly stories on Seminole area of Oklahoma for information concerning Kansas activities.

### OKLAHOMA

Date, 1928 Page

Two Wildcat Producers Offer Threat at Seminole.....Jan. 27 36
*By Wallace Davis*
Deepening Improves Logan County Producer.....March 16 49
Co-operative Wildcatting Proving Area South of Little River .....May 4 35
*By Wallace Davis*
Little River South Extension Shows Big Potential.....May 11 42
*By Wallace Davis*
Indicated Little River Wildcat Failure.....May 18 35
*By Wallace Davis*
Water Shows in Two Important Oklahoma Tests.....July 20 30
*By Wallace Davis*
Oklahoma City Wildcat May Start Drilling Campaign..July 27 51
*By Wallace Davis*
Oklahoma City Wildcat Flowing 1200 Barrels.....Dec. 7 94
*By Warren Baker*
Oklahoma City Wildcat Production Source Unknown..Dec. 14 25
*By Warren Baker*

### NORTH LOUISIANA-ARKANSAS

Palmer Corporation's Bossier Parish Well Looks Encouraging .....Feb. 24 32
Salt Water Shows in Palmer Well in Carterville District .....March 2 56
Final Test Shows Carterville Well All Wet.....March 9 48
Second Completion Gives New Arkansas Area Promise..April 27 44
Two Arkansas Wildcat Wells Show for Producers.....June 1 46
Showing of Gas in Sabine Parish Well Attracts Interest .....Sept. 7 40
Edge Wells and Wildcats Hold Louisiana Interest....Sept. 14 63
*By W. W. Moore*
Gas Show Gives Urania Area Shallow Sand Possibilities..Nov. 16 56
Sabine Parish Wildcat Makes 41 Gravity Oil.....Dec. 7 112
*By W. W. Moore*
North Louisiana-Arkansas Wildcats Hold Inerest.....Dec. 14 39

### SOUTH LOUISIANA

South Louisiana Very Active Wildcat Area.....Jan. 6 34
*By Jack Logan*
Wildcats Feature Gulf Coast Activity.....Feb. 10 29
*By Jack Logan*
Gulf's Sorrento Dome Well Flows 5000 Barrels.....Feb. 24 26
*By Jack Logan*
Kelso Bayou Dome is Outstanding Seismograph Discovery .....March 2 43
*By Jack Logan*
Rycade Gets 4000-Barrel Well at Atchafalaya .....March 16 38
Atchafalaya Producer Followed Long Period of Exploration .....March 23 43
Second Sorrento Dome Well Flows 900 Barrels.....April 27 38
*By Jack Logan*
Kelso Bayou Production Increased to 3500 Barrels Daily .....May 4 36
*By Jack Logan*
Third Producer in Coastal Field East of Mississippi..June 8 29
*By Jack Logan*
Coastal Wildcat Failures During Week Outnumber Wells .....Aug. 31 37
*By Jack Logan*
Drilling Into Salt Proves Bayou Blue Dome.....Dec. 14 35
See also the weekly "Developments in Gulf Coast Fields" under the heading in the outline of "Gulf Coast."

### CALIFORNIA

New Producing Area Opened in California.....Jan. 20 46
*By Brad Mills*
California Wildcat Producer Opens New Field (Fruitvale) .....Feb. 10 34
*By Brad Mills*
Fruitvale Producer Upsets Geological Dope.....Feb. 17 163
*By Brad Mills*
Potrero Well Closed in After Proving Worth.....April 27 35
*By Brad Mills*
Exploration in Southwestern Humboldt County, California .....May 11 54
New Producing Area (Lawndale-Hawthorne) Uncovered in Los Angeles Basin.....July 20 33
*By Brad Mills*

### ROCKY MOUNTAIN STATES

**General—**

Oil Show in Utah Wildcat .....Dec. 28 48
Repollo Tests in Colorado is Failure.....Feb. 10 32

**Montana—**

New Field in Montana Near Canadian Border.....Jan. 27 51
Kevin Sunburst West Side Looks Good.....Feb. 3 50
Showings Encourage More Sweet Grass Tests.....Feb. 10 38
Montana Wildcats Started .....Feb. 10 38
Wildcat Work Opening Up in Montana.....July 6 34

**New Mexico—**

Important Gas Discovery in Chaves County, New Mexico .....Feb. 10 20
Results Encourage Wildcat Work in New Mexico....Dec. 21 27
*By H. H. King*
Table of Lea County, New Mexico, Failures.....Dec. 21 28
Lea County Wildcat Operations (tabular form).....Dec. 21 28

**Wyoming—**

Oregon Basin Production Gets Wide Extension.....Feb. 17 160
New Light Oil Area Opened in Wyoming.....April 20 47
Three New Wyoming Fields This Month.....Sept. 7 56

### MISCELLANEOUS WILDCATS

North Dakota Wildcats .....Feb. 3 50

| | Date, 1928 | Page |
|---|---|---|
| New Michigan Area Gets Drilling Test | Dec. 7 | 114 |
| Starting Test in Western Tennessee | Dec. 7 | 162 |

**GAS DEVELOPMENT**

**Drilling and Exploration—**

| | | |
|---|---|---|
| Natural Gas Development in Southwest Texas Up to the Close of 1927 *By Jack Logan* | Feb. 17 | 55 |
| Two Wild Gassers in North Louisiana Section | Feb. 17 | 186 |
| Start Drilling for Gas | April 6 | 94 |
| Utah Gas Development | April 13 | 28 |
| New Kansas Gas Area | April 20 | 98 |
| Natural Gas Production in 1927 Attains Record Figure | Sept. 28 | 56 |
| Agua Dulce Gas Field in Southwest Texas Due Much Drilling | Sept. 28 | 56 |
| White Point Gas Wells Reclaimed After Blow-out and Fire | Sept. 28 | 57 |
| Natural Gas Production and Utilization in California | Dec. 7 | 102 |
| "The Natural Gas Industry," being a page of current events concerning the recovery and distribution of natural gas in the United States | Oct. 5 | 34 |
| The Natural Gas Industry | Oct. 12 | 40 |
| The Natural Gas Industry | Oct. 19 | 240 |
| The Natural Gas Industry | Oct. 26 | 38 |
| The Natural Gas Industry | Nov. 2 | 48 |
| The Natural Gas Industry | Nov. 9 | 38 |
| The Natural Gas Industry | Nov. 16 | 48 |
| The Natural Gas Industry | Nov. 23 | 37 |
| The Natural Gas Industry | Nov. 30 | 48 |
| The Natural Gas Industry | Dec. 7 | 102 |

**Distribution—**

| | | |
|---|---|---|
| Start Delivery of Texas Gas at Wichita, Kansas | Jan. 13 | 34 |
| Gas Line Extension Planned in West Texas | Feb. 17 | 76 |
| Magnolia to Build Extension to Louisiana Gas Line | April 20 | 46 |
| Dakotas to Get Natural Gas From Montana | April 27 | 46 |
| Utah Gas Franchise | July 27 | 152 |
| Cities Service Adds Gas Line to Kansas City | Aug. 3 | 34 |
| Ohio Gas Line Will Serve Cities in Utah | Aug. 24 | 88 |
| Will Pipe Louisiana Gas to Memphis | Aug. 31 | 46 |
| New Line Doubles Magnolia Gas Company's Capacity | Nov. 9 | 38 |
| El Paso to Have Natural Gas Supply | Dec. 28 | 88 |

**Technical and Operating—**

| | | |
|---|---|---|
| Effect of Barometric Pressure on Orifice Meter Measurement *By B. M. Laulhere and W. M. Young* | Feb. 10 | 54 |
| Typical Seminole Practice of Handling Gas *By H. L. Kauffman* | April 27 | 58 |
| Natural Gas Business in California Depends on Residue Gas *By William Moeller, Jr.* | May 4 | 46 |
| Depleted Gas Field Now Serves as Storage Tank *By Wallace Davis* | May 4 | 60 |
| Progress Made in Study of Gas Pipe Corrosion and Protection *By W. G. Hagen* | May 11 | 29 |
| Problems of the Natural Gas Industry in California *By Harrison P. George* | May 11 | 31 |
| Laboratory Aid in Improving Use of Natural Gas *By R. M. Conner* | May 11 | 33 |
| California Operators Seek Use for Surplus Gas Supply | Sept. 28 | 58 |
| Variables of National Gas Production and Utilization in California *By A. F. Bridge* | Oct. 5 | 39 |
| Stopping of Gas Losses Through Pipe Leakage | Dec. 28 | 70 |

**General Activities —**

| | | |
|---|---|---|
| Natural Gas Department of American Gas Association Meets at Dallas | Feb. 3 | 38 |
| Four Day Program Arranged for Dallas Natural Gas Meeting | March 23 | 36 |
| Comprehensive Program Arranged for Gas Men | April 13 | 27 |
| Montana Gas Companies Consolidate | May 4 | 44 |
| Plans All Made for Gas Men at Dallas | May 4 | 51 |
| Amalgamated Gas Associations Make Stronger Unit *By Spencer W. Robinson* | May 11 | 28 |
| Gas Men Study Scaled Rates for Industrial Plants | May 18 | 33 |
| Moody-Seagraves Purchase Makes Big Gas Combine | July 13 | 42 |
| Western Public Service Corporation Formed | Nov. 30 | 48 |

**FOREIGN**

**U. S. S. R. (Russia)——**

| | | |
|---|---|---|
| Russian Production Up to October, 1927 | Jan. 13 | 46 |
| Soviet Russia Production During November | Feb. 3 | 30 |
| Modern Methods More Prominent in Russian Operations *By Jack Logan* | March 30 | 60 |
| Organization and Financing of Russian Oil Industry *By M. M. Jurin* | March 30 | 70 |
| Developments in Russian Oil Fields During 1926-1927 *By Basil B. Zavoico* | April 6 April 13 | 43 99 |
| Soviet Seeks American Aid to Develop Oil Fields | Oct. 12 | 50 |

**South America—**

| | | |
|---|---|---|
| Producer Operates Home-Made Refinery in Trinidad *By Roy E. Leigh* | Jan. 6 | 47 |
| Bright Future For Argentine Oil Under Government Exploitation | Feb. 3 | 28 |
| Colombia Does Not Seek Oil Land Confiscation | March 9 | 39 |
| Argentina Has Big Sum for Oil Development | March 16 | 50 |
| American Oil Companies Want Colombian Decree Cancelled | March 16 | 50 |
| Fields of Peru Have Important Production *By A. R. McTee* | March 30 | 50 |
| Will Venezuela Be Our Next Market Buster? *By H. J. Struth* | March 30 | 51 |
| New Company Pushes Operations in Trinidad | March 30 | 54 |
| Crude Oil Production of Venezuela By Fields and Companies for 1927 | March 30 | 56 |
| California Producing Companies Active in South America *By Brad Mills* | March 30 | 67 |
| Venezuela Biggest Foreign Influence on American Market *By A. R. McTee and Wallace Davis* | March 30 | 75 |
| Life in the Tropics Has Its Advantages,—But Then— *By Roy E. Leigh* | March 30 | 82 |
| Colombian Production Doubled During 1927 *By L. G. Huntley* | March 30 | 86 |
| Less Known Productive Areas Have Important Potentialities | March 30 | 89 |
| Pew Tells of Restriction Plans After Trip to Venezuela | April 27 | 42 |
| Government of Colombia Enforcing Oil Law | May 25 | 48 |

**Mexico—**

| | | |
|---|---|---|
| Large Mexican Completion Made | Jan. 27 | 28 |
| Review of Mexican Field Operations During 1927 | Jan. 27 | 42 |
| Automatic Meters Installed As Aid to Determining Mexican Petroleum Tax | Jan. 27 | 94 |
| Mexican Production Off 26,000,000 Barrels | Feb. 17 | 166 |
| Mexican Operations Continue Quiet Despite Settlement | May 18 | 34 |
| Part of Mexican Decline is Lack of Operators' Interest *By George Blardone* | June 1 | 29 |
| Current Completions in Mexican Fields All Small Ones | June 1 | 32 |
| Mexican Exports 22 Per Cent Under Last Year | June 8 | 28 |
| Mexican Review Shows Marked Shipment Decline | July 13 | 87 |
| Mexican Production Under Last Year | July 27 | 120 |
| Mexican Oil Output is on Decline | Nov. 23 | 37 |
| Mexican Oil Controversy Settled | Dec. 14 | 98 |

**Foreign Miscellaneous—**

| | | |
|---|---|---|
| Spain Proposes Pay for Seized Oil Properties | Jan. 6 | 86 |
| Alaskan Production All Near Katalla | Jan. 6 | 102 |
| Cullinan Company Gets Spanish Contract | Jan. 13 | 34 |
| New French Oil Law | March 23 | 38 |
| Mesopotamia May Be Factor in Three Years *By R. L. Dudley* | March 30 | 49 |
| Lower Formations in Sumatra Hard to Handle *By J. D. Isaacks* | March 30 | 58 |
| Oil Production in India Steadily Declining | May 25 | 186 |
| Czechoslovakia Development Offers Opportunity to Americans *By Vladimir Shrivanek* | July 6 | 42 |
| Dutch Territories Opened to American Explorations | Sept. 28 | 72 |
| Petroleum Operations in Poland | Nov. 23 | 36 |
| Petroleum Problems Outside the United States *By Sir John Cadman, K.C.M.G., D.Sc.* | Dec. 7 | 44 |

**LAND AND LEASING**

| | | |
|---|---|---|
| Name Officers for Osage Lessees' Association | Jan. 13 | 40 |
| Texas Panhandle Leases Change Hands; Stocks Gain | Feb. 17 | 58 |
| Osage Leases Bring About Half of Normal Value *By Wallace Davis* | April 6 | 28 |
| California Company Adds to West Texas Holdings | April 13 | 40 |
| Loving-Reeves County Section Getting Strong Lease Play | April 13 | 57 |
| Pecos River Bed Lease Changes Hands Again | April 27 | 46 |
| Big Price For Lease | May 25 | 184 |
| Texas Company Buys Landreth's West Texas Properties *By H. King* | June 29 | 25 |
| Atlantic Buys Leases in Winkler County | July 13 | 28 |
| Big Block of Kansas Acreage in Co-operative Development | July 20 | 36 |
| Stronger Companies Quick to Buy Wildcat Discoveries *By H. H. King* | July 27 | 97 |
| Yount-Lee Buys Fee 7000 Acres, Including Sweet Lake Field | Aug. 24 | 32 |
| Osage Oil Rights Go to Bidders at Low Prices | Oct. 5 | 48 |
| Texas Company Takes Over Big South Louisiana Project | Nov. 30 | 33 |
| Texas Offering Oil Rights on 1,500,000 Acres | Dec. 7 | 126 |
| Texas Not to Auction Leases at This Time | Dec. 21 | 48 |
| Little Additional Drilling to Follow Sale of Osage Leases | Dec. 21 | 47 |


# Markets and Statistical

**MARKET REVIEW AND FORECASTS**


| | | |
|---|---|---|
| Market Situation Looking Better in Oklahoma | Jan. 6 | 25 |
| Year's Crude Price Adjustment is Downward | Jan. 20 | 25 |
| Initial New Season Gasoline Order Boosts Market | Jan. 27 | 25 |
| Extension of Seminole Shut-Down Strengthens Market | Feb. 3 | 25 |
| Gasoline Order Strengthens Refined Market | Feb. 10 | 16 |
| Chart Showing Comparison of U. S. Crude Price Structures (1922-1928) | Feb. 17 | 108 |
| Chart Showing Comparison of All Liquid Petroleum Stocks in U. S. (1923-1927) | Feb. 17 | 105 |
| Chart Showing U. S. Stocks of Refined Products | Feb. 17 | 103 |
| Chart Showing Output and Consumption of Refined Products (1923-1927) | Feb. 17 | 102 |
| Chart Showing Gasoline Trend for Past Six Years | Feb. 17 | 88 |
| Petroleum Marketed in United States (By States) From 1859 to 1927, Barrels of 42 Gallons | Feb. 17 | 115 |
| High Gravity Crude Increased in Price Adjustment *By Kent Ridley* | Feb. 24 | 15 |
| Readjusting Marketing in Mountain Region | Feb. 24 | 23 |
| Summer Should Bring Better Prices for High Gravity Crude *By Kent Ridley* | March 2 | 23 |
| High Grade Crude in Good Demand in Mid-Continent *By Kent Ridley* | March 9 | 23 |
| West Texas is Weak Spot in Crude Market *By Kent Ridley* | March 16 | 23 |
| Curtailment Talk Gives Market Better Tone *By Kent Ridley* | March 23 | 27 |
| Crude Market Situation Unchanged *By Kent Ridley* | March 30 | 39 |
| Movement of Gasoline Shows Marked Improvement *By Kent Ridley* | April 6 | 23 |

| | Date, 1928 | Page |
|---|---|---|
| Refiners Running Crude With Better Gasoline Demand.. *By Kent Ridley* | April 13 | 25 |
| Price Increase Expected to Follow Curtailment Move.. *By Kent Ridley* | April 27 | 25 |
| Crude Advances Would Help Refiners' Market..... *By Kent Ridley* | May 4 | 25 |
| Markets Stronger Despite Big Gain in Production..... *By Kent Ridley* | May 11 | 25 |
| Sharp Production Drop Adds Strength to Market..... *By Kent Ridley* | May 18 | 25 |
| Traders Expect Early Advance in Crude Prices..... *By Kent Ridley* | May 25 | 41 |
| Uncertainty of Proration Holding Crude Prices Down.. *By Kent Ridley* | June 1 | 23 |
| Refiners Increasing Crude Runs to Supply Gasoline.. *By Kent Ridley* | June 8 | 25 |
| Gasoline Profits Lost in Burning Oil Storage Accumulation . *By Kent Ridley* | June 15 | 25 |
| Proration Strengthens Market But Prevents Advance.. *By Kent Ridley* | June 22 | 25 |
| Gasoline Market Gaining Strength With Advancing Season . *By Kent Ridley* | June 29 | 25 |
| Holiday Buying Gives Gasoline Another Boost..... *By Kent Ridley* | July 6 | 25 |
| Ten Million Tank Cars in 1928 Gasoline Demand..... *By H. J. Struth* | July 6 | 29 |
| West Texas Bargain Crude No Longer Offered..... *By Kent Ridley* | July 13 | 25 |
| All Products Strong Except Fuel Oil..... *By Kent Ridley* | July 20 | 25 |
| Refined Prices Continue Their Upward Trend..... *By Kent Ridley* | July 27 | 49 |
| Higher Gravity Crudes Given Price Raise..... *By Kent Ridley* | Aug. 3 | 25 |
| Gasoline Insures Firm Market to Continue..... *By Kent Ridley* | Aug. 10 | 25 |
| Crude Market Remains Firm; Refined Products Still Advancing . *By Kent Ridley* | Aug. 17 | 25 |
| Production Climb Has Weakening Effect on Market.... *By Kent Ridley* | Aug. 24 | 25 |
| Oklahoma Fields Send Production to New High for Year . *By Kent Ridley* | Aug. 31 | 25 |
| Production Passes 2½-Million Mark Again..... | Sept. 7 | 29 |
| Drop in West Texas Brings U. S. Production Down.. | Sept. 14 | 25 |
| Seasonable Slump Effects Refiners' Market on Gasoline.. *By Kent Ridley* | Sept. 21 | 25 |
| Refiners Reducing Runs to Hold Gasoline Firm..... *By Kent Ridley* | Sept. 28 | 25 |
| West Texas Crude Not So Much in Demand..... *By Kent Ridley* | Oct. 5 | 25 |
| Clamor for More Oil Indicates Strength..... *By Kent Ridley* | Oct. 12 | 25 |
| Production Trend in Oklahoma Favors Market..... *By Kent Ridley* | Oct. 19 | 57 |
| Buyers Investigate West Texas as Oklahoma Slumps.. | Oct. 26 | 25 |
| Idea of Better Crude Prices Pending Spreading from Oklahoma . *By Kent Ridley* | Nov. 2 | 25 |
| Curtailed Refinery Runs Hold Gasoline Market Up.... | Nov. 9 | 23 |
| Crude Price Boost Talk is Premature..... | Nov. 16 | 25 |
| Cross Currents Present Complex Market Situation.... | Nov. 16 | 25 |
| Crude Oil Situation Shows Marked Improvement..... *By H. J. Struth* | Nov. 23 | 27 |
| California Production Threatens Market Stability..... *By H. J. Struth* | Nov. 30 | 25 |
| Rising Light Oil Production Checks Further Market Improvement . *By H. J. Struth* | Dec. 7 | 41 |
| Practically All Major Fields Show Increased Production . *By H. J. Struth* | Dec. 14 | 23 |
| Eastern Boost of No Significance to General Market... *By H. J. Struth* | Dec. 21 | 25 |
| California and Texas Production Getting Out of Bounds.. *By H. J. Struth* | Dec. 28 | 25 |
| Better Refinery Control Reduces Demand for Crude... *By H. J. Struth* | Dec. 28 | 29 |


## MONTHLY PRODUCTION STATISTICS


| | | |
|---|---|---|
| Curtailment Lowered Production During December..... *By A. R. McTee* | Jan. 20 | 33 |
| Production Decline Continues During January..... *By A. R. McTee* | Feb. 24 | 17 |
| February Production Falls Below Previous Month..... *By A. R. McTee* | Mar. 23 | 37 |
| Drilling and Output Increased During March ..... *By A. R. McTee* | April 13 | 29 |
| Daily Average Was Greater During April Than March.. *By A. R. McTee* | May 18 | 37 |
| Proration Movement Lowers Output During May..... *By A. R. McTee* | June 22 | 55 |
| Gain in Few Districts Puts July Production Up..... *By A. R. McTee* | Aug. 17 | 27 |
| Oklahoma Gains Send Production Up During August... *By A. R. McTee* | Sept. 21 | 43 |
| Oklahoma Responsible for Production Increase During September . *By Jack Logan* | Oct. 26 | 35 |
| Sharp Decline in New Production During November..... *By H. J. Struth* | Dec. 14 | 37 |


### PANHANDLE AND WEST TEXAS STOCK STATISTICS


| | | |
|---|---|---|
| Pipe Line Congestion Causes Piling Up of Panhandle Stocks During December ..... | Jan. 20 | 40 |
| Panhandle Stocks Gain ..... | Feb. 17 | 58 |
| Panhandle Stocks Lower as Production Drops..... | April 20 | 42 |
| Tank Building Ahead of Production in West Texas..... *By H. H. King* | April 27 | 32 |
| Steel Storage Facilities in the North Texas District By Counties, Fields and Companies..... | May 25 | 59 |
| West Texas Has Ample Surplus of Tank Room..... *By H. H. King* | May 25 | 62 |
| Table Showing Location of All West Texas Steel Storage Tanks, by Fields, Companies and Counties..... | May 25 | 63 |
| Texas Panhandle Crude Stocks Reduced During April... | May 25 | 155 |
| Panhandle Stock Depletion Strengthens Market..... | June 29 | 42 |
| West Texas Tank Capacity Above 45 Million Barrels... *By H. H. King* | July 27 | 116 |


### MAGNOLIA PIPE LINE RUNS


| | | |
|---|---|---|
| Magnolia Line Movement Increased in December..... | Jan. 20 | 68 |
| Magnolia Crude Shipments Reach New High Record.... | Feb. 17 | 160 |
| Magnolia Pipe Line Runs at New Peak in February.... | Mar. 16 | 56 |
| Magnolia Shows Increase in Pipe Line Movements for March . | April 27 | 104 |
| Magnolia Line Runs Unaffected by Curtailed Production.. | May 25 | 162 |
| Magnolia Pipe Line Runs Under Previous Month..... | June 15 | 90 |
| Magnolia Pipe Line Runs Show Increase in July..... | Aug. 17 | 42 |
| Magnolia Shipments to Atlantic Coast Off; Line Runs Show Increase ..... | Nov. 9 | 32 |
| Magnolia Runs Reach New Peak; Runs Not in Proportion . | Nov. 30 | 50 |


### BUREAU OF MINES FIGURES


| | | |
|---|---|---|
| Seaport States Lead in Quantity of Fuel Oil Consumed.. | Jan. 6 | 42 |
| Bureau of Mines Figures Reveal Production Decrease in November . | Jan. 13 | 35 |
| Analysis of Supply and Demand for 1927, By Months..... | Feb. 17 | 154 |
| Analysis of Stocks of Oils for 1927, By Months..... | Feb. 17 | 154 |
| Bureau Report Shows Production Drop in December.... | Feb. 17 | 156 |
| Analysis of Supply and Demand of All Oils..... | Feb. 17 | 156 |
| Report Gives Detail of Stock and Production Gain in March . | May 11 | 48 |
| Natural Gasoline Plants in the United States..... | May 11 | 52 |
| Bureau of Mines Review Analyzes Situation in April.... | June 29 | 32 |
| Fuel Consumption of Railroads ..... | Sept. 14 | 28 |
| Atlantic Refineries Use More Foreign Crude..... | Sept. 28 | 52 |
| Deliveries of Gas Oil and Fuel Oil Increase in 1927..... | Nov. 9 | 58 |


### GENERAL FIELD AND PRODUCTION STATISTICS

#### Oklahoma Quarterly Production Reports


| | | |
|---|---|---|
| Production Report for Fourth Quarter, 1927..... | Mar. 9 | 92 |
| Production Report for First Quarter, 1928..... | June 1 | 83 |
| Production Report for Second Quarter, 1928..... | Aug. 24 | 109 |
| Production Report for Third Quarter, 1928..... | Nov. 23 | 106 |


#### Texas Quarterly Production Reports


| | | |
|---|---|---|
| Production Report for Fourth Quarter, 1927..... | Feb. 24 | 42 |
| Production Report for First Quarter, 1928..... | May 25 | 164 |
| Production Report for Second Quarter, 1928..... | Aug. 24 | 103 |
| Production Report for Third Quarter, 1928..... | Nov. 30 | 85 |


#### Figures on World Petroleum


| | | |
|---|---|---|
| Estimates Give World Total of 1,244,915 Barrels..... *By A. R. McTee* | Jan. 16 | 27 |
| World Production of Petroleum by Countries for Last 10 Years . | Jan. 27 | 26 |
| World's Production of Crude Petroleum Since 1857, By Years and Countries ..... | Feb. 17 | 113 |
| Chart Shows Relative Volume of Petroleum; i. e. The World versus the United States ..... | Feb. 17 | 99 |


### UNITED STATES FIELD STATISTICS


| | | |
|---|---|---|
| Summary of Field Operations for December, 1927..... | Jan. 20 | 52 |
| Summary of Field Operations for January, 1928..... | Feb. 24 | 38 |
| Summary of Field Operations for February, 1928..... | Mar. 23 | 70 |
| Summary of Field Operations for May, 1928..... | June 22 | 68 |
| Summary of Field Operations for June, 1928..... | July 20 | 58 |
| Summary of Field Operations for July, 1028..... | Aug. 17 | 60 |
| Summary of Field Operations for August, 1928..... | Sept. 21 | 46 |
| Summary of Field Operations for September, 1928..... | Oct. 26 | 91 |
| Summary of Field Operations for October, 1928..... | Nov. 23 | 41 |
| Summary of Field Operations for November, 1928..... | Dec. 14 | 68 |
| Wells Drilled For Oil and Gas in United States, 1859-1927 . | Feb. 17 | 131 |
| U. S. Field Statistics for 1926-1927 ..... | Feb. 17 | 131 |
| Chart Showing U. S. Production and Field Statistics, 1923-1927, Inclusive ..... | Feb. 17 | 93 |
| Field Statistics By States for First Three Months of 1927 and 1928 ..... | May 11 | 30 |
| Porduction Statistics for First Three Months of 1926-1927 . | May 18 | 30 |


### ARTICLES ON U. S. PRODUCTION


| | | |
|---|---|---|
| Week's Completions Have Large Initial Average..... *By Jack Logan* | Jan. 6 | 24 |
| Daily Average Production Drops 40,700 Barrels..... *By Kent Ridley* | Jan. 13 | 25 |
| New Producers Add 83,200 Barrels Initial Production... *By Jack Logan* | Jan. 13 | 26 |
| Production Decline Continues, But More Slowly..... *By Kent Ridley* | Jan. 20 | 23 |
| Production Shows Slight Gain; More Completions..... *By Kent Ridley* | Jan. 27 | 23 |
| Crude Production Decline is General..... *By Kent Ridley* | Feb. 3 | 23 |
| United States Production Makes Slight Gain..... *By Kent Ridley* | Feb. 10 | 15 |
| Crude Production Again Takes a Downward Turn..... *By Kent Ridley* | Feb. 17 | 41 |
| General Production Decline Continues ..... | Jan. 6 | 23 |
| Daily Average in October Up 6800 Barrels..... *By Jack Logan* | Nov. 23 | 39 |

## WEST TEXAS GENERAL STATISTICS


| | Date, 1928 | Page |
|---|---|---|
| Big West Texas Wells Boost Initial Production Totals.... *By Jack Logan* | Jan. 20 | 24 |
| Bulk of New Production From Wells in West Texas..... *By Jack Logan* | Feb. 3 | 24 |
| Big Flush Production in Three West Texas Counties..... *By H. H. King* | Feb. 17 | 53 |
| West Texas Steel Tankage, Built and Building, By Fields, Counties and Companies | Feb. 24 | 19 |
| West Texas Production By Fields, Counties, Companies.. | Jan. 6 | 56 |
| West Texas Production By Fields, Counties and Companies | Jan. 13 | 50 |
| West Texas Production By Fields, Counties and Companies | Jan. 20 | 56 |
| West Texas Production By Fields, Counties and Companies | Jan. 27 | 54 |
| West Texas Production By Fields, Counties and Companies | Feb. 3 | 28 |
| West Texas Production By Fields, Counties and Companies | Feb. 17 | 168 |
| West Texas Production By Fields, Counties and Companies | Feb. 24 | 31 |
| West Texas Production By Fields, Counties and Companies | Mar. 2 | 60 |
| West Texas Production By Fields, Counties and Companies | Mar. 16 | 46 |
| West Texas Production By Fields, Counties and Companies | Mar. 23 | 54 |
| West Texas Production By Fields, Counties and Companies | Mar. 30 | 104 |
| West Texas Production By Fields, Counties and Companies | April 6 | 40 |
| West Texas Production By Fields, Counties and Companies | April 13 | 50 |
| West Texas Production By Fields, Counties and Companies | April 20 | 49 |
| West Texas Production By Fields, Counties and Companies | April 27 | 56 |
| West Texas Production By Fields, Counties and Companies | May 11 | 62 |
| West Texas Production By Fields, Counties and Companies | May 18 | 50 |
| West Texas Production By Fields, Counties and Companies | June 1 | 50 |
| West Texas Production By Fields, Counties and Companies | June 15 | 51 |
| West Texas Production By Fields, Counties and Companies | June 29 | 56 |
| West Texas Production By Fields, Counties and Companies | July 6 | 50 |
| West Texas Production By Fields, Counties and Companies | July 13 | 56 |
| West Texas Production By Fields, Counties and Companies | July 27 | 128 |
| West Texas Production By Fields, Counties and Companies | Aug. 10 | 56 |
| West Texas Production By Fields, Counties and Companies | Aug. 17 | 58 |
| West Texas Production By Fields, Counties and Companies | Aug. 24 | 70 |
| West Texas Production By Fields, Counties and Companies | Aug. 31 | 56 |
| West Texas Production By Fields, Counties and Companies | Sept. 21 | 42 |
| West Texas Production By Fields, Counties and Companies | Sept. 28 | 72 |
| West Texas Production By Fields, Counties and Companies | Oct. 5 | 36 |
| West Texas Production By Fields, Counties and Companies | Oct. 12 | 44 |
| West Texas Production By Fields, Counties and Companies | Oct. 19 | 264 |
| West Texas Production By Fields, Counties and Companies | Oct. 26 | 46 |
| West Texas Production By Fields, Counties and Companies | Nov. 2 | 53 |
| West Texas Production By Fields, Counties and Companies | Nov. 9 | 64 |
| West Texas Production By Fields, Counties and Companies | Nov. 30 | 54 |


## MISCELLANEOUS STATISTICS


| | | |
|---|---|---|
| Review of Mexican Oil Field Operations During 1927 | Jan. 27 | 42 |
| Report Gives 92,144,935,000 Barrels as Possible Oil Content in Shales in United States.... *By Dean E. Winchester* | Feb. 3 | 45 |
| Gulf Coast Production By Fields For Past Two Years.... | Feb. 3 | 48 |
| Kansas Production Loses in 1927 (Year's Figures) | Feb. 17 | 51 |
| Fault Area of Texas Yields 27,072 Barrels per Acre..... | Feb. 17 | 52 |
| Crude Imports From South America Increase (Article includes 1927 export-import table) | Feb. 17 | 56 |
| Chart Showing Summary of Crude Petroleum, 1921-1927... | Feb. 17 | 84 |
| Yearly Production of All U. S. Fields, 1900-1927 | Feb. 17 | 96 |
| Gravity Classification of Petroleum Produced in the United States During 1927 | Feb. 17 | 117 |
| Petroleum Produced in U. S. in 1927, By States | Feb. 17 | 117 |
| Louisiana Production By Fields, By Years, 1905-1927.... | Feb. 17 | 127 |
| Arkansas Production By Fields, By Years, 1921-1927..... | Feb. 17 | 129 |
| Eastern States Completions, 1926-1927 | Feb. 17 | 131 |
| Arkansas Completions By Fields, 1926-1927 | Feb. 17 | 132 |
| Louisiana Completions By Fields, 1926-1927 | Feb. 17 | 136 |
| Production of Natural Gasoline By Districts and By Months for 1927 | Feb. 17 | 138 |
| Gross Production of Louisiana-Arkansas Fields By Months During 1927 | Feb. 17 | 152 |
| Venezuelan Oil Statistics for 1927 | Mar. 30 | 80 |
| Production Greatly Reduced as Second Half Starts..... | July 20 | 41 |
| Comparative Field Statistics for California, First Half... | July 27 | 140 |
| Comparative Field Statistics for Oklahoma, First Half, 1928 | July 27 | 140 |
| Comparative Field Statistics for Texas, First Half, 1928.. | July 27 | 144 |


# Pipe Line and Transportation

## WEST TEXAS


| | | |
|---|---|---|
| Humble Seeks Three Year Contract in West Texas..... | Jan. 6 | 26 |
| Landreth Building Line From Hendrick Field..... | Jan. 6 | 29 |
| Atlantic Building Line In West Texas..... | Jan. 6 | 29 |
| Roxana Finishing Second Hendrick Field Line..... | Jan. 6 | 29 |
| Increased Tank Car Movement Raises Yates Field Output. *By H. H. King* | Jan. 27 | 32 |
| Gas Line Extensions Planned in West Texas..... | Feb. 17 | 76 |
| Atlantic Increasing West Texas Pipe Line Capacity..... | Mar. 9 | 24 |
| West Texas Crude Getting Wide Rail Distribution..... *By H. H. King* | Mar. 30 | 41 |
| More West Texas Oil to Move to Atlantic Coast Plants.. | April 20 | 25 |
| West Texas Lines Expected Ready for Use by June 1.... | April 20 | 36 |
| West Texas Has 200,000 Barrel Pipe Line Outlet..... *By H. H. King* | May 25 | 51 |
| Map of Oil Pipe Lines in West Texas..... | May 25 | 52 |
| Much West Texas Oil Moved in Tank Cars..... *By H. H. King* | May 25 | 99 |
| Texas and Atlantic Announce Lines from West Texas... *By H. H. King* | June 29 | 30 |
| Magnolia Increasing Capacity of West Texas Line..... | July 20 | 38 |
| West Texas Crude Draws Many Miles of Pipe Line..... *By H. H. King* | July 27 | 70 |
| Heavy Shipment in Tank Cars from West Texas..... | July 27 | 122 |
| Roxana Adds West Texas Storage to Serve New Line.... *By H. H. King* | Oct. 19 | 59 |
| Shell Line from Upton County, Texas, to Houston..... | Nov. 2 | 34 |
| Gulf's West Texas Line to Be Increased in Capacity.... | Dec. 21 | 29 |
| Atlantic Line Will Start Movement Next Week..... | Dec. 21 | 44 |


## PANHANDLE


| | | |
|---|---|---|
| Magnolia Will Build Line from Panhandle to Fort Worth. | Mar. 16 | 56 |
| Cities Service Begins Gas Line Extension..... | June 29 | 48 |
| Panhandle-Kansas City Line Half Completed..... | Sept. 7 | 58 |


## GULF COAST


| | | |
|---|---|---|
| Magnolia Starts Using New Coast Line..... | Mar. 30 | 101 |
| Pipe Line Capacity to Texas Coast Greatly Increased..... *By A. R. McTee* | May 25 | 56 |
| Companies Own Private Docks on Texas Coast..... *By Jack Logan* | May 25 | 68 |
| Oil Is Important Item at Gulf of Mexico Ports..... | July 6 | 28 |


## TEXAS MISCELLANEOUS


| | | |
|---|---|---|
| Completion of Magnolia Loop March 1..... | Feb. 10 | 32 |
| Magnolia to Build Extension to Louisiana Gas Line..... | April 20 | 46 |
| Mexia Corsicana District Has Become Big Storage Center. *By H. H. King* | May 25 | 54 |
| Texas Company Has Big Pipe Line Program in Texas... | July 6 | 26 |
| Texas Crude Oil Rates Extended by Commission..... | July 13 | 87 |
| Pipe Line Removes Restrictions from Greyback Pool..... | Sept. 28 | 44 |
| Pure Oil Line Starts Interstate Shipments | Oct. 5 | 52 |
| Changes Made in Texas Rail Rates on Oil Field Machinery | Nov. 16 | 30 |
| Special Crude Oil Freight Rates in Texas Extended..... | Nov. 30 | 29 |
| Reductions Made in Texas Rates on Crude Oil..... | Dec. 28 | 42 |


## OKLAHOMA


| | | |
|---|---|---|
| Long Gas Pipe Line Built Across Oklahoma-Kansas During Year | May 25 | 50 |
| Multiple Small Lines Built to Handle Seminole Flush Output *By Grady Triplett* | May 25 | 51 |
| Sinclair Increasing Pipe Line Capacity to Chicago..... | July 27 | 52 |
| St. Louis to Have Outlet of 100,000 Barrels..... | Aug. 24 | 36 |
| Texas Company Will Build Line From Oklahoma to Chicago | Sept. 21 | 32 |


## MOUNTAIN STATES


| | | |
|---|---|---|
| Isles Line is Finished | Feb. 17 | 165 |
| LaBarge, Wyoming, Line | Mar. 16 | 48 |


See also "Mountain States Development Notes" under "Proven Fields and Extensions"

## MISCELLANEOUS PIPE LINE AND TRANSPORTATION


| | | |
|---|---|---|
| Start Movement Through Long Line in Mid-summer.... *By Wallace Davis* | April 6 | 40 |
| Long Arc Welded Gas Line Completed | May 25 | 67 |
| Tankers — Their Use Unlimited *By E. M. Clark* | May 25 | 80 |
| Twin Screw Diesel Tanker Among Largest..... | May 25 | 82 |
| Table Showing United States Tanker Registry..... | May 25 | 83 |
| Table Showing Pipe Line Transportation Rates..... | May 25 | 88 |
| Freight Rates on Crude Petroleum (Tabular Form)..... | May 25 | 93 |
| Table Showing Domestic Rates on Crude Oil Between Points in Texas | May 25 | 94 |
| Development of Tank Cars..... *By R. H. Cobb* | May 25 | 102 |
| Pipe Lines Needed to Relieve Champagnolle Situation... | June 8 | 56 |
| Wichita-Ottawa Gas Line | June 15 | 46 |
| Southwest Freight Rate Revision Effective July 8..... | June 29 | 54 |
| New Line Uses Centrifugal Pumps..... | July 13 | 90 |
| Cities Service Adds Gas Lines to Kansas City..... | Aug. 3 | 34 |
| Proposed Texas Freight Rate Changes Effect Oil Field Supplies | Aug. 24 | 29 |
| Ohio Gas Line Will Serve Cities in Utah..... | Aug. 24 | 88 |
| Will Pipe Louisiana Gas to Memphis..... | Aug. 31 | 46 |
| Moody-Seagraves Starts Work on New Line from Louisiana | Nov. 2 | 48 |
| New Line Doubles Magnolia Gas Company's Capacity.... | Nov. 9 | 38 |
| Marland Building 50-mile Line From Wichita, Kansas.... | Dec. 21 | 29 |

## MAPS

### TEXAS


| | Date, 1928 | Page |
|---|---|---|
| Fry District, Brown County, map showing lease ownership around high gravity area uncovered by Pandem Oil Corporation | Jan. 20 | 43 |
| Hendrick Field, map showing completed oil wells, active operations, and wells making water | Mar. 9 | 41 |
| South Liberty Field, map showing northwest extension | Mar. 9 | 57 |
| Sugar Land Field | April 6 | 32 |
| Wells in Hendrick Field Showing Water | May 4 | 30 |
| Map showing relation of Gibson-Johnson et al's wildcat producer in northern Winkler County to the Llano-Roxana pumpers and two producers across the state line in New Mexico | May 18 | 29 |
| Yates Field, map showing proposed division of field into 100-acre units for conservation | May 25 | 52 |
| West Texas, map showing oil pipe lines of West Texas | May 25 | 52 |
| West Texas, map showing oil pipe lines and proposed lines | July 27 | 76 |
| Llano Pool, northern Winkler County | July 27 | 78 |
| Hendrick Field, Winkler County | July 27 | 80 |
| Yates Field, Pecos County | July 27 | 82 |
| Church & Fields and Gulf McElroy areas, Crane and Upton Counties | July 27 | 84 |
| Chalk-Roberts Field, Howard-Glasscock Counties | July 27 | 86 |
| Royston Field, Fischer County | July 27 | 88 |
| Noodle Creek Field, Jones County | July 27 | 90 |
| Big Lake Field, Reagan County | July 27 | 92 |
| Brown County, map showing area north of Fry Pool | Aug. 3 | 38 |
| Smith-Ellis Pool, Brown County, map showing sub-surface structure of | Aug. 3 | 39 |
| Barbers Hill — ownership map | Oct. 12 | 31 |
| Salt Domes Along Texas Coast | Nov. 16 | 43 |


### OKLAHOMA


| | Date, 1928 | Page |
|---|---|---|
| Pools in the Greater Seminole Area | Feb. 17 | 47 |
| Burbank Extension | Feb. 17 | 48 |
| Logan County | Feb. 17 | 49 |
| Allen Field, Pontotoc County | Feb. 17 | 50 |
| South Little River Field | June 29 | 29 |
| St. Louis Field | Aug. 17 | 33 |
| Earlsboro Extension | Sept. 7 | 35 |
| Ownership of Oklahoma City Area | Dec. 14 | 27 |
| Burbank Field | Dec. 21 | 94 |
| Allen Pool | Dec. 28 | 35 |


### CALIFORNIA


| | Date, 1928 | Page |
|---|---|---|
| Important Oil Regions of Southern California | Feb. 17 | 69 |
| Southwestern Humbolt County, geological map of sections of | May 11 | 56 |
| Hawthorne District | Sept. 7 | 32 |
| Brea-Olinda Field, central portion of | Oct. 12 | 52 |
| Brea-Olinda Field, central portion of | Oct. 12 | 54 |
| Brea-Olinda Field, central portion of | Oct. 12 | 56 |


### LOUISIANA


| | Date, 1928 | Page |
|---|---|---|
| Known Domes and Supposed Domes in Southern Louisiana | Nov. 16 | 40 |
| Pine Island Field, Caddo Parish, map showing development of Trinity formation there | Feb. 17 | 80 |
| Champagnolle Field, Union County, Arkansas, map showing wells up to Feb. 17, 1928 | Feb. 17 | 144 |
| McElroy-Sorrento (Sorrento) Dome, Ascension Parish | Feb. 24 | 26 |
| Kelso Bayou Field | Mar. 2 | 44 |


### OTHER MAPS


| | Date, 1928 | Page |
|---|---|---|
| Lost Springs, Kansas, area | Mar. 9 | 39 |
| Trinidad, South America, map showing producing fields, refineries and roads | Mar. 30 | 55 |
| Maracaibo Lake Region, South America | Mar. 30 | 76 |
| Map of the Early Oil Country, Pennsylvania | Oct. 26 | 76 |
| Magnolia Gas Company Main Line System, Texas and Louisiana | Nov. 9 | 38 |


## ELECTRICAL DEVELOPMENT


| | Date, 1928 | Page |
|---|---|---|
| Start Electrification of Kevin-Sunburst | Feb. 3 | 50 |
| Electric Methods of Applied Geophysics<br>*By. Dr. Erich Pautsch* | Feb. 24 | 33 |
| Synchronous Motors and Centrifugal Pumps in Pipe Line Service<br>*By L. J. Murphy* | May 25 | 57 |
| Increased Electric Power | May 25 | 124 |
| Early Application of Electricity to Oil Well Pumping<br>*By C. M. Wise* | Dec. 21 | 98 |


# *Index to* The OIL WEEKLY, Covering 1929

## Engineering—Technical—Research

### GENERAL


| | Date, 1929 | Page |
|---|---|---|
| Conference Studies Oil Equipment Problems | Jan. 18 | 29 |
| Technical Committee to Advise on Pollution | Sept. 6 | 116 |
| Gas Association Open Flow Committee Continues Study | Sept. 20 | 77 |
| Technical and Association Meetings Feature Sixth International Petroleum Exposition | Oct. 4 | 55 |
| Proportion of Formation Gas to Oil | | |
| By Harry Pennington | Nov. 15 | 23 |
| Second Installment | Nov. 22 | 30 |
| Third Installment | Nov. 29 | 32 |
| Fourth Installment | Dec. 6 | 28 |
| Economic Problems of Petroleum Differ from Other Industries<br>*By W. N. Davis* | Nov. 15 | 65 |
| Metallurgy of Drilling Equipment<br>*By H. W. Fletcher* | Dec. 6 | 32 |


### A. P. I.


| | Date, 1929 | Page |
|---|---|---|
| Crude Stocks Increased During December | Feb. 15 | 29 |
| Committees Organized to Perfect A. P. I. Curtailment Plan | Feb. 22 | 77 |
| A. P. I. Curtailment Committee Gets Going at Tulsa | March 1 | 47 |
| A. P. I. Directors Approve World Curtailment Plan | April 5 | 66 |
| A. P. I. Plans Fall Meet of Louisiana-Arkansas District | June 28 | 91 |
| A. P. I. Directors to Meet During Oil Exposition | June 28 | 107 |
| 1929 "Facts and Figures" Published by Institute | Sept. 6 | 116 |
| Exposition Presents Busy Scene as Sixth Session Opens<br>*By Grady Triplett* | Oct. 11 | 35 |
| Louisiana-Arkansas Division Names Officers and Committees | Nov. 15 | 52 |
| Belt and Boiler Committee Programs Arranged | Nov. 22 | 63 |
| Institute's Activities Detailed in President's Address<br>*By E. B. Reeser* | Dec. 6 | 21 |
| Institute to Widen Activities in Refining and Marketing<br>*By Grady Triplett* | Dec. 6 | 35 |
| Common Sense in the Oil Industry<br>*By Sir Henry W. A. Deterding* | Dec. 6 | 37 |
| Industry Organizations in Stabilization Parley | Dec. 6 | 38 |
| Lucey Pledges A. P. I. to Help Re-establish Confidence | Dec. 6 | 55 |
| Harmony and Progress Mark Institute Meeting<br>*By Grady Triplett* | Dec. 13 | 56 |
| Further Field Codes Developed at Chicago | Dec. 13 | 59 |


### CONSERVATION


| | Date, 1929 | Page |
|---|---|---|
| 1. Conservation and the Government | | |
| Wilbur Replaces West on Oil Conservation Board | March 8 | 50 |
| Conservation Board Suggests Unrestricted Imports | March 8 | 50 |
| Wilbur Calls Conference on Kettleman Hills | April 26 | 36 |
| Senate Resolution Questions Hoover's Oil Policy | April 20 | 62 |
| Oil Board Points Out State Rights in Conservation Move | April 19 | 39 |
| Washington Withholds Approval of Institute's Conservation Plan | April 4 | 37 |
| Texas Company Protests Government Order | April 5 | 42 |
| Government Takes Further Steps in Oil Conservation | May 24 | 58 |
| Hoover's Conservation Plan Approved | May 10 | 50 |
| Seven Governors to Participate in Conservation Parley | June 7 | 40 |
| Little Hope for State Compact Revealed in Preliminaries at Colorado Springs<br>*By Grady Triplett* | June 14 | 27 |
| Governor Brooks Has Heard Conservation Plea Before<br>*By Grady Triplett* | June 21 | 35 |
| Washington Reports Acceptance of Kettleman Hills Agreement | Aug. 9 | 65 |
| Wilbur Outlines Government Conservation Policy | Dec. 6 | 41 |
| 2. General— | | |
| Bar Committee Makes Report Proposing Legislation | Jan. 11 | 35 |
| Turner on Conservation Board Committee | Feb. 1 | 40 |
| A. P. I. Executive Committee Plans World-Wide Production Curtailment; State Sanction Urged<br>*By Grady Triplett* | Feb. 15 | 36 |
| Sunday Shut-down Would Make Ideal Curtailment Plan<br>*By Grady Triplett* | Feb. 22 | 67 |
| Benefit of Sunday Plan Depends on Nation-wide Observance<br>*By H. J. Struth* | March 1 | 40 |
| Regional Committees Acting on Conservation Plan | March 29 | 51 |
| A. P. I. General Conservation Committee to Meet at Houston | April 15 | 54 |
| Sunday Shut-down Effects Production Declines | March 15 | 43 |
| Limitation of Crude Output up to Regional Committee<br>*By Wallace Davis* | March 22 | 19 |
| Curtailment Machinery Still in Low Gear | April 12 | 63 |
| Latest Development in Conservation | May 10 | 48 |
| Smith Points Out Importance of Public Domain Curtailment | May 17 | 58 |
| Plan for Conservation Meet June 10 | May 31 | 58 |
| Industry Finally Becoming Curtailment-Minded | Oct. 4 | 197 |
| Interstate Conservation Pact Idea Still Alive | Oct. 11 | 180 |
| Market Outlook Prompts Concerted Curtailment Effort | Nov. 1 | 37 |
| Curtailment Improves Crude Carry-over Outlook<br>*By H. J. Struth* | Nov. 29 | 29 |
| Further Curtailment Necessary to Reduce Surplus Crude Supply | Dec. 13 | 265 |
| 3. In California | | |
| California Cut Agreed Upon | March 29 | 53 |

| | Date, 1929 | Page |
|---|---|---|
| California Umpire Issues Order for 129,530 Barrel Cut | April 26 | 43 |
| Expect Curtailment Order in California April 20 | April 19 | 62 |
| Curtailment of Drilling Affects San Francisco | May 5 | 20 |
| Additional Curtailment Orders Due in California | May 24 | 53 |
| Conservation of Kettleman Hills Presents Complex Problem | May 17 | 63 |
| Completions Overcome Curtailment at Santa Fe Springs | May 17 | 61 |
| Government Approves Conservation Pact | June 14 | 57 |
| California Curtailment Effort Big Joke | June 14 | 57 |
| California Conservation Plan Abolished | June 28 | 33 |
| *By Wm. E. Green* | | |
| Government Wants Rigid California Control | July 5 | 60 |
| Move to Comply With Gas Law Without Curtailing Oil Output | July 19 | 51 |
| California Drilling Unabated Despite Curtailment Effort | July 26 | 67 |
| *By Brad Mills* | | |
| Bay Region Doesn't Want Kettleman Controlled | July 26 | 168 |
| Proposed Plan of Gas Disposition Sent to California Operators | Aug. 30 | 48 |
| Kettleman Agreement is Held Up | Aug. 30 | 48 |
| No Magic in California Gas Conservation Law | Sept. 6 | 40 |
| *By Brad Mills* | | |
| Natural Decline a Factor in Initial Failure of California Gas Laws | Sept. 13 | 39 |
| Kettleman Hills Pact Awaits One Signature | Sept. 20 | 55 |
| Gas Conservation Law Hits Snag; Injunction Postponed | Sept. 27 | 23 |
| *By Brad Mills* | | |
| California Operators Far From Agreement on Handling of Surplus Gas | Oct. 4 | 54 |
| *By Brad Mills* | | |
| Kettleman Hills Agreement Seen as Big Step in Conservation | Oct. 4 | 223 |
| Conservation Will Prolong Life of Santa Fe Springs | Oct. 18 | 28 |
| *By Joseph Jensen, McDowell Graves, W. D. Goold and M. L. Gwin* | | |
| Caliofrnia Conservation Suit Delayed by Defense | Oct. 25 | 23 |
| *By Brad Mills* | | |
| California Operators Reverse Ideas on Need for Production Curtailment Following Drastic Cut in Prices | Nov. 1 | 21 |
| More Delay in California Gas Waste Injunction | Nov. 1 | 35 |
| By Brad Mills | | |
| California Curtailment Practically Eliminates Excess Crude | Nov. 15 | 39 |
| **4. In the Mid-Continent** | | |
| Committee of Nine Named Mid-Continent Association | Jan. 11 | 44 |
| Sunday Observance Idea Gains Favor in Mid-Continent | March 1 | |
| *By Warren Baker* | | |
| Oklahoma City Operators Plan Conservative Development | Aug. 23 | 23 |
| *By Warren Baker* | | |
| Commission to Hold Curtailment Hearing on Oklahoma City | Sept. 6 | 80 |
| Conservation Movement Enlarged in Oklahoma | Sept. 27 | 25 |
| *By Grady Triplett* | | |
| Oklahoma Operators Plan Drastic Production Curtailment | Oct. 11 | 181 |
| *By Grady Triplett* | | |
| Oklahoma Operators Curtailment Plan Officially Approved | Oct. 18 | 39 |
| *By Warren Baker* | | |
| Propose Flexible Import Embargo to Match Domestic Curtailment | Nov. 8 | 25 |
| *By Grady Triplett* | | |
| Kansas Agreed on Conservation; Divided on Method | Nov. 15 | 54 |
| Oklahoma Curtailment to March 31 Seen as Imperative | Dec. 6 | 53 |
| **5. In Texas** | | |
| Texas Division Directors Talk Conservation Plans | Jan. 1 | 29 |
| Plan to Curtail Winkler Output Dropped | March 8 | 34 |
| *By H. H. King* | | |
| Winkler Operator Protests Water Encroachment Report | March 15 | 58 |
| Yates Pool Holds Present Output | March 29 | 53 |
| West Texas an Incentive to Success of California Curtailment | April 26 | 23 |
| *By H. J. Struth* | | |
| Feasibility of Nation-wide Control Exemplified by Winkler Plan | April 5 | 21 |
| *By H. J. Struth* | | |
| Sunday Shut-down Plan Extends to West Texas | March 22 | 65 |
| Operators in Panhandle Section Agree to Reduce Output | Aug. 30 | 52 |
| Agreement Extended to Include North Dome | Sept. 27 | 67 |
| Restriction of Crude Run Forces Settles Production Curtailment | Nov. 15 | 56 |
| Darst Curtailment Agreement Near Follow-in Second Meeting | Nov. 22 | 35 |
| *By Jack Logan* | | |
| **6. International** | | |
| Four-way Agreement Effectively Curtailing Venezuela | April 26 | 21 |
| *By Roy E. Leigh* | | |

## PRORATION

| | | |
|---|---|---|
| **1. General** | | |
| Extended Proration on Further Reduction is Ultimatum | Feb. 15 | 39 |
| Farish Stresses Proration Need in Statement to Stockholders | Feb. 15 | 50 |
| New Production in Sight Helps Proration Aims | March 29 | 64 |
| Proration Not to Retard Wildcat Drilling | April 5 | 76 |
| Proration versus Tests | April 5 | 76 |
| Proration Effort Brings Further Slight Decline | May 10 | 39 |
| **2. In the Mid-Continent** | | |
| Mid Kansas Asks Committee to Increase Yates Prorated Run | April 27 | 51 |
| Oklahoma Allowable Production Raised to 725,000 Barrels | May 17 | 66 |
| Pending Proration Move Causes Rush to East Earlsboro | Sept. 27 | 51 |
| Two New Kansas Fields Under Proration | Oct. 18 | 39 |
| Proration Gauge Plan Changed at East Earlsboro by Umpire | Nov. 15 | 54 |
| Oklahoma City Operators Extend Proration Agreement | Nov. 29 | 42 |
| Oklahoma Prorated Quota Adopted through March | Dec. 20 | 27 |
| *By Grady Triplett* | | |
| Proration of McPherson County Extended | Dec. 20 | 54 |
| **3. In Texas** | | |
| Yates Proration Increased 15,000 Barrels by Commission | Jan. 18 | 39 |
| Howard-Glasscock to Meet Quota | March 29 | 51 |
| Winkler County Cut 25,000 Barrels | March 29 | 51 |
| West Texas Production Cut 45,000 Barrels | April 5 | 62 |
| Limit Proration Tests in Winkler County to Conserve Pressure | April 19 | 54 |
| Winkler County Asks for Proration Extension | April 26 | 56 |
| Yates Proration Raise is Held in Abeyance | April 26 | 58 |
| Expect 30,000-Barrel Increase for Yates Proration | June 28 | 102 |
| Proration Gauge Slows Yates Field Slightly Under Peak | July 5 | 63 |
| Winkler County Will Get Another Hearing | July 19 | 43 |
| Texas Commission Allows Increase in Prorated Production | Aug. 16 | 35 |
| Extension of Proration Probable in Winkler | Oct. 25 | 53 |
| Commission Extends Winkler County Proration Rules | Nov. 8 | 49 |
| Howard-Glasscock Field Proration Meeting | Nov. 22 | 43 |
| Howard-Glasscock Proration Step Affects Deep Oil Producers | Nov. 29 | 30 |
| *By H. H. King* | | |
| Make Plans for Darst Creek Proration on Jan. 1 | Dec. 20 | 62 |
| Darst Creek Wells to be Gauged for Proration Dec. 30 | Dec. 27 | 27 |
| *By Jack Logan* | | |
| Operators to Consider Gray County Proration Plan | Dec. 27 | 51 |
| **4. In California** | | |
| Santa Fe Springs Operators Agree on Output of 125,000 Barrels | April 5 | 44 |
| California Operators Agree Upon Proration Schedule | April 12 | 83 |
| New Wells Offset Proration Effort at Santa Fe Springs | May 3 | 86 |
| Second California Shut-down Order Takes in More Fields | May 10 | 49 |
| California Third Proration Order Completes Program | May 17 | 58 |
| Proration Will Reduce Drilling at Santa Fe Springs | Nov. 22 | 67 |
| Profit-Sharing Plan in California | Dec. 6 | 67 |
| New Santa Fe Springs Proration Plan Will Close New Wells | Dec. 20 | 63 |

## UNIT DEVELOPMENT

| | | |
|---|---|---|
| **1. General** | | |
| Committee of Nine Wants Committee of Three | Jan. 18 | 44 |
| Davis Takes Lead in Unit Plan of Wildcat Drilling | March 1 | 47 |
| A. I. M. E. Will Study Unit Operation | Oct. 11 | 36 |
| Procedure for Exploitation of Oil-Bearing Structure by Unit Operation | Nov. 8 | 34 |
| *By C. S. Corbett* | | |
| Association Speakers Urge Unit Operation | Nov. 15 | 64 |
| *By H. H. King* | | |
| Engineers May Lead Way to Practical Unitization | Dec. 13 | 60 |
| **2. In Mid-Continent** | | |
| Unit Operation as Means of Curtailment | Nov. 8 | 36 |
| *By Warren Baker* | | |
| Mid-Continent Association Will Consider Definite Plan of Unitization | Nov. 22 | 29 |
| Mid-Continent Association Adopts Unitization Plea | Nov 29 | 51 |
| **3. In Texas** | | |
| West Texas Men Oppose "Unit Operation" Bill | Feb. 1 | 38 |
| *By H. H. King* | | |
| Big Companies Pool Interests in New Van Field | Nov. 8 | 30 |
| *By H. H. King* | | |
| Co-operative Drilling Looms for North Texas Area | Nov. 15 | 62 |
| Reeser Urges Unit Plan Adoption Before Texas Producers | Nov. 15 | 65 |
| Three Tests Drilling in Van Pool Under Cooperative Plan | Nov. 22 | 56 |
| Unit Operation Plan Gains Wide Acceptance in Texas | Dec. 13 | 58 |
| *By H. H. King* | | |
| **4. In Other States** | | |
| Lea County (New Mexico) Operators Will Use 40-Acre Unit Plan | Oct. 11 | 197 |
| Cooperative Deep Test in Smackover Field | Dec. 20 | 58 |

## FIELD PRACTICE AND METHODS

### AIR AND GAS LIFT

| | | |
|---|---|---|
| Union Has Efficient Gas Lift Plant at Richfield | Jan. 4 | 39 |
| *By Brad Mills* | | |
| Simple Heater Corrects Paraffin Trouble in Gas Lift Wells | April 26 | 26 |
| *By Warren Baker* | | |
| Rejuvenation of the Stover Pool, Brown County, Texas | April 12 | 50 |
| *By G. H. L. Kent* | | |
| Function of Gas in Oil Production Covered in Report | May 31 | 37 |
| Tulsa Engineers Hold Conference on Gas Lift and Crooked Holes | May 31 | 35 |
| *By George Reid* | | |
| Oil Production by Gas Lift | June 21 | 27 |
| *By R. H. Pence* | | |
| Gas Lift Research Costs Lives of Two Engineers | Dec. 20 | 54 |

### LEASE ECONOMY

| | | |
|---|---|---|
| This Oklahoma Lease is Example of Real Lease Economy | Jan. 4 | 41 |
| *By Wallace Davis* | | |
| Waste Water Cleaned at Santa Fe Springs with Minimum Cost to Producers | May 10 | 24 |
| *By Brad Mills* | | |
| Experiments Show Nickel Screen Economical in Gulf Coast | Aug. 30 | 29 |

| | Date, 1929 | Page |
|---|---|---|
| Creosoted Timbers for Marine Construction Prove Economical | Nov. 15 | 30 |
| Advanced Methods Reduce Lifting Cost at Brea Canyon<br>*By Art White and Brad Mills* | Nov. 29 | 35 |
| **CROOKED HOLES** | | |
| Crooked Holes—Causes and Effects<br>*By Frederic H. Lahee* | March 29 | 29 |
| Second installment | April 5 | 27 |
| Overcoming Crooked Holes<br>*By W. W. Warner* | April 12 | 49 |
| Surveys of Well Wanderings Aid to Engineers<br>*By Alexander Anderson* | April 19 | 27 |
| A Seismic Method of Determining the Deviation of Drill Holes<br>*By Mark C. Malamphy* | April 26 | 31 |
| Acid Bottle Method of Surveying Holes<br>*By Hu M. Harris* | May 3 | 47 |
| California Division has Crooked Hole Program | May 10 | 41 |
| Tulsa Engineers Hold Conference on Gas Lift and Crooked Holes<br>*By George Reid* | May 31 | 35 |
| Straight Hole Practice<br>*By W. J. Whitford* | June 7 | 21 |
| Correcting Crooked Holes at Barbers Hill<br>*By P. C. Murphy* | July 19 | 31 |
| Questionnaire Develops Data on Crooked Hole Problem | Sept. 13 | 28 |
| A Drilling Contractor Talks on Value of Drilling Straight Holes<br>*By Fred M. Allison* | Sept. 20 | 42 |
| Straight Hole Drilling Practice<br>*Compiled by John Franklin Dodge* | Dec. 13 | 61 |
| A Contribution to Straight Hole Drilling Theory<br>*By J. T. Haywood* | Dec. 20 | 29 |
| **CEMENTING** | | |
| Gulf Coast Cementing Problems<br>*By W. T. Doherty and M. Manning* | April 12 | 47 |
| **DRILLING AND PRODUCING** | | |
| Distillation Test on Crude Petroleum<br>*By H. L. Kauffman* | Feb. 8 | 23 |
| Rods Break Most Near Surface<br>*By F. W. Lake* | Feb. 8 | 28 |
| Old Methods Still Used in Field Crowded by City Growth<br>*By Brad Mills* | Feb. 8 | 32 |
| The Effect of Producing Wells Shutting in the Offset Wells<br>*By C. M. Nickerson* | March 8 | 24 |
| Recording Instruments Aid in Holding Wells to Maximum Production<br>*By Wallace Davis* | March 22 | 31 |
| Effects of Choking Wells in Winkler County, Texas<br>*By E. N. Van Dusee* | April 12 | 43 |
| "Black Diamond" Used in Core Drilling<br>*By Richard A. Jones* | April 26 | 35 |
| Rotary Fishing and Fishing Tools<br>*By Harry Pennington* | May 3 | 45 |
| Second Part | May 10 | 30 |
| Third Part | May 17 | 37 |
| Fourth Part | May 24 | 29 |
| New Methods of Pumping Wells from Standard Rig | June 14 | 67 |
| Increased Drilling Activity During May<br>*By H. J. Struth* | June 21 | 73 |
| Deep Drilling Requires More Than Just Better Tools<br>*By Brad Mills* | July 5 | 31 |
| Effective Beam Pumping of Large Capacity Wells<br>*By H. T. Wyatt* | July 5 | 35 |
| Drilling is Defferent in Kettleman Hills | July 5 | 62 |
| Preventing Blowouts While Drilling Through High Pressure Zones<br>*By Bernard H. Scott* | Aug. 8 | 23 |
| Weighing and Counterbalancing Wells<br>*By W. C. Shutts and B. L. Moore* | Sept. 6 | 46 |
| Standard Drilling Report Form Suggested | Sept. 13 | 29 |
| Care in Drilling Makes Great Depths Easy to Attain<br>*By Brad Mills* | Oct. 4 | 64 |
| Deep Drilling Revises Old Fields in Gulf Coast<br>*By Jack Logan* | Oct. 4 | 68 |
| Oklahoma Hard Formations Require Advance Methods and Heaviest Drilling Equipment<br>*By Harry Pennington* | Oct. 4 | 75 |
| Formula Developed for Proper Spacing of Wells | Oct. 18 | 27 |
| Automatic Pump Stations for Handling Small Loads<br>*By Warren Baker* | Oct. 25 | 27 |
| Methods of Tubing High Pressure Wells<br>*By H. C. Otis* | Nov. 1 | 27 |
| Capping Kettleman Hills Wild Well Required Ingenuity | Dec. 20 | 31 |
| **REPRESSURING** | | |
| Repressuring Semi-Flush Properties<br>*By Wallace Davis* | Feb. 15 | 30 |
| Repressure Big Lake with Gas from Deep Well | March 15 | 58 |
| Repressuring and its Effect on the Natural Gasoline Industry<br>*By E. O. Bennett* | May 31 | 25 |
| Pressure Control of Oil Wells<br>*By E. H. Griswold and W. J. Wilkins* | June 7 | 28 |
| Coming out under Pressure Handles "Heaving" Shale Problem | June 14 | 36 |
| Seminole District Engineers Have Repressuring Round Table | June 21 | 54 |
| Seminole Engineers Discuss Back Pressure on Pumping Wells | Aug. 23 | 35 |
| Progress Shown in Repressuring and Crooked Hole Work<br>*By Wm. V. Gross* | Sept. 13 | 25 |
| Oklahoma's Experimental Field Responds to Repressuring<br>*By Warren Baker* | Sept. 20 | 41 |
| Repressuring Questionnaire Basis for A. P. I. Chicago Session | Oct. 4 | 227 |
| Repressuring in Depleted Oil Zones<br>*By C. M. Nickerson* | Oct. 11 | 44 |
| Valuable Data on Repressuring Brought out by Questionnaire | Oct. 18 | 32 |
| Tonkawa Engineers Discuss Results of Repressuring<br>*By Warren Baker* | Nov. 29 | 40 |
| **MISCELLANEOUS** | | |
| It is Hard to Imagine Hauling Mud to an Oil Field<br>*By L. G. E. Bignell* | Jan. 4 | 36 |
| Distillation Test on Crude Petroleum<br>*By H. L. Kauffman* | Feb 8 | 23 |
| Factors Involved in Lessening Evaporation Losses<br>*By H. L. Kauffman* | March 1 | 28 |
| Weight Indicator Solves Many Drilling Problems<br>*By Wallace Davis* | March 8 | 23 |
| Modern Gas Trap Installation<br>*By C. C. Taylor* | March 15 | 32 |
| A Gas Preheater of Simple Design<br>*By H. L. Kauffman* | April 26 | 30 |
| Economical Proportions for Steel Oil Storage Tanks<br>*By H. C. Boardman* | June 14 | 27 |
| Prestretching Cmposition Belts<br>*By Robert Burnett* | July 12 | 24 |
| World's Deepest Hole Nearing 9000 Feet | July 12 | 56 |
| Proper Method of Making Gravity Test on Crude Oil<br>*By H. L. Kauffman* | July 19 | 24 |
| Making Joints in Oil Field Belts<br>*By Robert Burnett* | July 19 | 32 |
| Record Material Delivery for Deep Well | July 19 | 52 |
| Electric Welded Oil Line Handles Near Capacity 10 Days After Stations are Opened<br>*By H. H. King* | Aug. 2 | 21 |
| Mud Weight Maintained by Special Aerating Process | Aug. 30 | 27 |
| Methods Separating Oil and Water<br>*By Warren Baker* | Aug. 30 | 38 |
| Home Fabricated Treating Plant Used by Comar<br>*By Warren Baker* | Sept. 6 | 41 |
| Use and Care of Sucker Rods<br>*By R. H. Reese* | Sept. 6 | 50 |
| Care of Sucker Rods<br>*By E. Stanley Durward* | Sept. 6 | 51 |
| Metallurgy of Hard-Faced Rotary Drill Bits<br>*By W. A. Wissler and C. W. Metzger* | Sept. 6 | 52 |
| Salt Water Disposal<br>*By S. W. Oberg* | Sept. 6 | 58 |
| Faulting Around Salt Domes<br>*By Jack Logan* | Sept. 13 | 30 |
| Modern Methods and Equipment Lower Costs on World's Deepest Producer<br>*By H. H. King* | Oct. 4 | 73 |
| Factors Affecting Footage Costs on California Deep Wells<br>*By Brad Mills* | Oct. 4 | 101 |
| Comparison of Torsion Balance and Geologic Interpretations of Outline of Blue Ridge Salt Dome<br>*By Jack Logan* | Oct. 11 | 37 |
| Hancock Terminal at Los Angeles Provides Most Modern Facilities for Ocean Loading<br>*By Brad Mills* | Nov. 1 | 25 |
| Heavy Services Sends Much Still Good Material to Reclamation Yards<br>*By Brad Mills* | Nov. 8 | 26 |
| **STANDARDIZATION** | | |
| Standardization Again Main Topic for A. P. I. Gathering | Nov. 29 | 31 |
| **GEOLOGICAL** | | |
| Arkansas Has Six Geological Projects | Feb. 8 | 70 |
| Oklahoma Geological Survey | Feb. 22 | 57 |
| Data Published on Dupo Oil Field in Illinois | March 15 | 78 |
| Abstracts of Papers on Technical Program (A. A. P. G.) | March 22 | 69 |
| Consulting Geologists Form Association | March 22 | 44 |
| Geologists Association to Widen Research Scope<br>*By Wallace Davis* | March 29 | 27 |
| Geologists Visit Fields in Mountain Area | Sept. 20 | 77 |
| Study of Sub-Surface Conditions in Erath County, Texas<br>*By R. O. LaNeve* | Oct. 11 | 179 |
| Scouts Make Geological Journey to Arbuckle Mountains | Nov. 1 | 56 |
| Arbuckle Mountain Trip Reveals Oklahoma Geological Strata<br>*By Warren Baker* | Nov. 8 | 54 |
| Geologists Plan to Show a "Century of Progress"<br>*By Warren Baker* | Dec. 6 | 64 |
| **GEOPHYSICAL** | | |
| The Seismograph in the Gulf Coast<br>*By Mark C. Malamphy* | Jan. 18 | 31 |
| South Louisiana Has Real Future in Newly Found Domes<br>*By Jack Logan* | Feb. 1 | 84 |
| Home of "Gator" and Water Lily Opened for Oil by Science<br>*By Wallace Davis* | Feb. 1 | 69 |
| Most Recently Found Domes Were "Shot" After Gas Seeps and Paraffine Dirt Showed the Way<br>*By Wallace Davis* | Feb. 1 | 77 |

| | Date, 1929 | Page |
|---|---|---|
| Factors in Design of Portable Field Seismographs ....*By Mark C. Malamphy* | March 22 | 28 |
| "Geophysical Prospecting, 1929," Issued by A. I. M. E. | March 22 | 82 |
| Bureau Reports on Rock Creek and Adjacent Wyoming Areas | April 20 | 37 |
| Dynamometer Records Rod Stress Throughout Pump Stroke ....*By George Reid* | May 31 | 29 |
| Device Indicates Direction of Oil Flow in Sand | May 24 | 115 |
| Abandonments Vindicate Seismic Instruments | June 28 | 108 |
| Geophysical Instruments and Methods ....*By Mark C. Malamphy* | July 12 | 31 |


# Features—News—Editorials


### EDITORIALS

| | | |
|---|---|---|
| Who Asked Immunity? | April 4 | 39 |
| An Understanding President | March 1 | 32 |
| More Recognition for Natural Gas | May 17 | 57 |
| What Editors Are Saying ....*By Kent Ridley* | July 19 | 28 |
| Why There Will Be No Oil Tariff | July 26 | 82 |
| The Exposition's Duty | Oct. 4 | 55 |
| Increasing the Exposition's Value | Oct. 4 | 56 |
| Let's Conserve Their Time | Oct. 18 | 25 |
| The Conservation Movement and the Institute | Dec. 13 | 57 |
| No Tariff Needed Against South America | Dec. 13 | 69 |

### ECONOMIC SITUATION

| | | |
|---|---|---|
| Pogue's Review Shows Industry Facing Grave Situation | Jan. 11 | 33 |
| Competition for Crude Despite Increased Supply....*By Kent Ridley* | Jan. 18 | 25 |
| Crude Market Structure is Weakening....*By H. J. Struth* | Jan. 25 | 25 |
| Further Downward Revision of Crude Prices Anticipated | Feb. 1 | 45 |
| Oil Pays Government Big Royalty Profits | Feb. 8 | 78 |
| Million Barrels Winkler Oil Sold Below Market | Feb. 15 | 46 |
| Lower Crude Market Only Alternative to Expidite Control | March 1 | 37 |
| Advocacy of Tariff Disproved by Growing Foreign Trade....*By H. J. Struth* | Aug. 9 | 52 |
| Garfias Predicts Production Gain for 1929 | Oct. 11 | 210 |
| "The Economic Lesson of 1928-29 in The Petroleum Industry"....*By Joseph E. Pogue* | Oct. 4 | 124 |

### CONVENTIONS AND MEETINGS

| | | |
|---|---|---|
| Oil Scouts Convention at Fort Worth May 30 | March 1 | 63 |
| Expect Record Attendance at Geologists Meeting | March 8 | 53 |
| Fort Worth Geologists Program Arranged | March 15 | 54 |
| Program Fort Worth Meeting (A. A. P. G.) | March 22 | 67 |
| Mid-Continent Scouts Meet April 26-27 | April 5 | 90 |
| Plans Shaping Up for Big Gas Convention | April 5 | 70 |
| Engineers' Meeting at Dallas Draws Interested Attendance....*By Wm. V. Gross* | April 12 | 53 |
| Fall Meeting to Continue Crooked Hole Discussion | April 12 | 56 |
| Attendance Record Texas-Arkansas-Louisiana District A. P. I. Division of Development and Production Engineering Meeting | April 12 | 57 |
| Preliminary Plans Formulated for 1929 Exposition at Tulsa | April 12 | 75 |
| A. I. M. E. Plans for 1929 | April 26 | 102 |
| Program Completed for Kansas City Convention | April 12 | 119 |
| California Engineers Hold Meeting | May 3 | 87 |
| Sholom Alchem Expecting Big Oklahoma City Meeting | May 3 | 129 |
| Natural Gas Men Review Year's Progress at Kansas City | May 10 | 36 |
| Straight Holes and Gas Lift on Engineers' Program at Tulsa | May 10 | 52 |
| Fort Worth Meeting of Scouts Being Arranged | May 10 | 58 |
| Important Matters Deferred at Gas Meeting | May 17 | 56 |
| Preliminary Meet on Interstate Compact Held at New York | May 24 | 41 |
| Straight Holes and Gas Lift on Tulsa Program | May 24 | 61 |
| Petroleum Given Prominent Place at Engineers' Meet | May 3 | 50 |
| Natural Gas Men All Set for Big Convention | May 3 | 61 |
| Scout Association Merger Nearer After Wichita Meeting | May 3 | 84 |
| Convention for Business Only, Institute Decides | June 14 | 106 |
| Colorado Conference Recesses for Further Study....*By Grady Triplett* | June 21 | 21 |
| Natural Gas Men Protest Flood Control Plan | June 28 | 111 |
| Small Attendance Marks California A. P. I. Meet | July 5 | 35 |
| Petroleum Exposition to Broaden Scope | July 5 | 81 |
| Los Angeles to Have Own Equipment Exhibit | July 26 | 187 |
| Mid-Continent A. P. I. Meeting Date Set | Aug. 9 | 55 |
| Permanent Equipment Exposition is Planned (Los Angeles) | Aug. 16 | 68 |
| Many Scientific Meetings During Tulsa Exposition Planned | Aug. 23 | 36 |
| Institute Directors Meet Next at Tulsa | Aug. 23 | 36 |
| Pipe Line Problems Will Come Before Engineers | Aug. 30 | 35 |
| Exposition is to Have Welding Contest | Aug. 30 | 38 |
| Engineers Tackle Field Problems at Galveston | Sept. 6 | 45 |
| International Petroleum Exposition Committees Names at Tulsa | Sept. 6 | 112 |
| "Grand Old Man" Nominations Are in Order | Sept. 6 | 112 |
| A. I. M. E. Session to Precede Exposition | Sept. 13 | 56 |
| Roster of Attendance at Galveston Meeting | Sept. 13 | 26 |
| Belting Problems Discussed by Seminole Engineers | Sept. 20 | 44 |
| Burbank Chapter Meeting Features Repressuring | Sept. 20 | 44 |
| Kansas-Oklahoma Division Meeting (Mid-Continent Oil & Gas Association) | Sept. 20 | 44 |
| Repressuring is Subject for Engineers' Meeting | Sept. 20 | 64 |
| Conservation Agents Plan Tulsa Meet | Sept. 20 | 77 |
| Los Angeles A. I. M. E. Meet Oct. 4-5 | Sept. 20 | 83 |
| Engineers Hear Review of Standardization Program....*By Warren Baker* | Sept. 27 | 28 |
| Mid-Continent Division Meets During Tulsa Exposition | Sept. 27 | 30 |
| Alberta Oil and Gas Association Meeting Includes Field Trips | Sept. 27 | 59 |
| Sun-Twin State Field Men Hold Conference | Sept. 27 | 62 |
| Program Sixth International Petroleum Exposition and Congress | Oct. 4 | 61 |
| Calgary Convention Visitors Learn About Canadian Oil | Oct. 4 | 109 |
| Report Added Members at N. P. A. Meeting | Oct. 4 | 226 |
| Los Angeles Group Hears Papers on Operating Problems | Oct. 11 | 36 |
| A. P. I. Engineering Division has Big Attendance at Tulsa | Oct. 11 | 193 |
| Shreveport Geological Society Has Meeting | Oct. 11 | 210 |
| San Antonio Geological Society Holds Meeting | Oct. 18 | 56 |
| Mid-Continent Oil and Gas Association to Meet at San Angelo | Oct. 18 | 56 |
| Drumright Chapter A. P. I. has Monthly Meeting | Oct. 25 | 50 |
| Engineers Discuss Things Seen at Exposition | Oct. 25 | 50 |
| 10-Minute Talks Feature Geologists' Weekly Meet | Nov. 1 | 60 |
| Preliminary Program for A. P. I. Annual Meeting Announced | Nov. 8 | 56 |
| Paleontologists to Hold Meeting at Austin | Nov. 8 | 64 |
| Burbank Engineering Chapter Studies Working Barrels | Nov. 22 | 54 |
| Mountain Association Has Interesting Session | Nov. 22 | 62 |
| Paleontologists Hold Fall Session at Austin | Nov. 22 | 62 |

### PERSONNEL AND SAFETY

| | | |
|---|---|---|
| Safety Work Proves Monetary Value of California....*By Brad Mills* | Jan. 25 | 76 |
| Tankers Explosions Prevented by Excluding Air From Cargo Space | Feb. 8 | 25 |
| Winning Interest of Production Men in Safety....*By C. L. Hightower* | Feb. 15 | 26 |
| Safety Engineers Form Association | April 26 | 56 |
| Three Killed When Oil Catches Fire | April 26 | 52 |
| Specially Equipped Car Aids Carrying Safety Message | April 26 | 38 |
| Safety in Operation Would Reduce Compensation Rates | May 17 | 42 |
| High Pressure Methods on High Pressure Fires....*By A. J. Mason, Jr.* | March 8 | 30 |
| Safe Operation of Air and Gas Lifts ....*By F. W. Robson* | May 17 | 35 |
| Considerable Interest is Shown in Safety Contest | June 28 | 114 |
| Make Plans for Contest at First Aid Exposition | Aug. 23 | 90 |
| Thirty Teams Will Compete in Annual First Aid Contest | Oct. 4 | 62 |
| Touch of Realism Injected Into First Aid Meet | Oct. 18 | 26 |
| Ninety-Day 'No Accident' Contest to be Held | Dec. 6 | 104 |

### PERSONALITIES IN OUR INDUSTRY

| | | |
|---|---|---|
| P. C. Jones Remembers First Gas Engine at Corsicana | Jan. 25 | 102 |
| I "Kin" Remember the First Well Drilled in North Louisiana | Oct. 2 | 74 |
| Industry's "Old Timers" Receive Honors | Oct. 18 | 25 |
| How Oil Men Play | Nov. 22 | 66 |

### ENGINEERING AND TECHNICAL

| | | |
|---|---|---|
| Proper Casing and Tubing of Gas Wells....*By H. C. Otis* | Jan. 18 | 35 |
| Hydraulics of Salt Dome Waters....*By Harry Pennington* | Feb. 1 | 27 |
| Centralization Reduces Flow Tank Expense....*By George Reid* | Feb. 1 | 32 |
| Open Flow by Pressure Methods....*By E. L. Rawlins* | Feb. 1 | 33 |
| Is Petroleum Industry Over-Engineered? | Feb. 8 | 36 |
| Controlling High Pressures and Large Flows....*By Harry Pennington* | Feb. 15 | 19 |
| Conserving Gas in Texas Panhandle....*By George Reid* | Feb. 15 | 23 |
| A Pressure-Volume Decline Curve for Measuring Gas Well Volumes....*By C. P. Parsons* | Feb. 15 | 31 |
| Engineers Gathered at New York for Annual Meeting....*By H. J. Struth* | Feb. 22 | 86 |
| Means of Controlling Gas-Oil Ratio (A. I. M. E.)....*By Hallan N. Marsh and Bruce H. Robinson* | March 1 | 21 |
| Modern Methods of Deep Well Drilling....*By W. W. Scott* | May 3 | 49 |
| Expansion in Long Pipe Lines....*By J. H. Pound* | May 10 | 21 |
| Some Pipe Line and Transmission Problems....*By John C. Diehl* | May 10 | 27 |
| Engineering Study of Roberts-Settles Oil Pool | May 31 | 58 |
| Determining Stresses in Pumping Belts....*By Robert Burnett* | Aug. 2 | 24 |
| West Texas Organizes Division of Production Engineering | Aug. 2 | 62 |
| Heat Treatment of Steel—*By Harry Pennington* | | |
| First Installment | Aug. 9 | 28 |
| Second Installment | Aug. 16 | 27 |
| Third Installment | Aug. 23 | 27 |
| Fourth Installment | Aug. 30 | 30 |
| Fifth Installment | Sept. 6 | 101 |
| Sixth Installment | Sept. 13 | 32 |

| | Date, 1929 | Page |
|---|---|---|
| Progress in Carbon Black Manufacture ..... *By H. L. Kauffman* | Aug. 9 | 31 |
| Frictional Properties of Oil Field Belting ..... *By Robert Burnett* | Aug 30 | 23 |

## SPECIAL FEATURES

| | | |
|---|---|---|
| Who Would Steal Nitro-Glycerine? ..... *By Grady Triplett* | Jan. 4 | 55 |
| Two Great Fires ..... *By George Blardone* | Jan. 4 | 56 |
| Equipment for Drilling Exploration Wells by the Rotary Method ..... *By Wendell M. Jones* | Jan. 11 | 86 |
| After Deep Domes—Then What? ..... *By John F. Weinzierl* | Feb. 8 | 34 |
| Fuel Oil, the Safety Valve of the Oil Industry (A. I. M. E.) ..... *By Chas. J. Deegan* | March 1 | 25 |
| Some Facts Worth Knowing About Oil Storage ..... *By H. L. Kauffman* | March 15 | 19 |
| Planes Bring Distant Fields Near Headquarters ..... *By Brad Mills* | March 22 | 32 |
| Earliest Mention of Petroleum in New World Was Mexican ..... *By George Blardone* | March 8 | 54 |
| Pioneer Spirit Exists in Remote West Texas Camp .... *By H. J. Struth* | May 24 | 26 |
| Ananias Was No Engineer! ..... | May 24 | 35 |
| Scouting ..... *By L. E. Phillips* | May 24 | 113 |
| Drillers Deserting Burro Travel for "Wings" in Tropical Fields ..... | May 31 | 36 |
| Mexican Official Likens America Unto the Prodigal Son ..... *By Roy E. Leigh* | June 14 | 29 |
| Refining Industry Has Extensive Expansion Program .. *By George Reid* | July 26 | 212 |
| Prayer Supersedes Wiggle Stick in Well Location ..... | Aug. 30 | 78 |
| Letters of Paul Peebles P. S. G. ..... | Oct. 4 | 240 |
| Early Problems of Marketing and Transportation Were Overcome as They Developed ..... *By George Reid* | Aug. 9 | 34 |
| Methods May Improve But Oil "Booms" Go on Forever ..... *By Kent Ridley* | Nov. 8 | 28 |
| New Basis Field Tribute to Subsurface Methods ..... *By Brad Mills* | Dec. 27 | 30 |

### CORROSION

| | | |
|---|---|---|
| Corrosion Has Been a Problem Since the Iron Age .... *By L. G. E. Bigness* | Jan. 25 | 27 |
| Methods of Covering Pipe to Prevent Corrosion ..... *By Wm. Moeller, Jr.* | May 10 | 26 |
| Corrosian of Oil Storage Tanks Studied at Borger ..... | Nov. 1 | 76 |
| Aluminum and Its Alloys as Corrosion-Resistant Material in the Oil Industry ..... *By Stanley Gill* | Dec. 6 | 23 |

### AVIATION AND THE OIL INDUSTRY

| | | |
|---|---|---|
| $40,000 Saved by Using Airplanes in One Day ..... | June 28 | 147 |
| Airplane Service Makes Hours of Days Travel in South America ..... *By Roy E. Leigh* | July 12 | 28 |
| Oil Officials Survey Fields by Airplane ..... | July 12 | 62 |
| Being Up in the Air Keeps Pipe Line Executive on the Ground ..... *By Jack Logan* | Aug. 23 | 25 |
| California Air Trip Demonstrates Value of Aviation to the Oil Industry ..... *By H. J. Struth* | Sept. 13 | 23 |
| Aerial Meet Stresses Importance of Aviation to Industry ..... | Oct. 18 | 26 |

### FINANCIAL

| | | |
|---|---|---|
| Standard of California Earnings Increased ..... | March 22 | 57 |
| Humble Employes Stock Plan Distribution ..... | March 1 | 66 |
| Gulf Oil Corporation Nets 36 Million ..... | April 5 | 72 |
| Cranfill-Reynolds Nucleus of Merger Involving Six Companies ..... | July 26 | 153 |
| Mergers of Sinclair and Prairie Nearing Completion ... | Aug. 30 | 52 |
| Dividends of Standard Oil Group Break All Records ... | Oct. 4 | 98 |
| Progress Reported in Prairie-Sinclair Merger ..... | Oct. 4 | 195 |
| Lone Star Gas Company Expands Through Stock Purchase ..... | Nov. 1 | 32 |
| Prairie Dividend Statement ..... | Nov. 22 | 46 |
| Prairie-Sinclair Merger Again Being Rumored ..... | Dec. 6 | 77 |

### GENERAL NEWS

| | | |
|---|---|---|
| Spread of Cooperative Spirit Seen as Year's Best Achievement ..... *By E. B. Reeser* | Jan. 4 | 30 |
| San Angelo Prepares for Oil Men Jan. 24-25 ..... | Jan. 11 | 42 |
| Royalty Owners Organize Texas Division ..... | Jan. 18 | 52 |
| Unfavorable Outlook Emphasized at A. I. M. E. Meeting ..... *By H. J. Struth* | March 1 | 19 |
| California Refinery Sets New Record in January ..... | March 8 | 46 |
| Hoover's Policy is Not to Lease Government Lands .. | March 15 | 52 |
| Rockfeller Ousts Stewart From Standard of Indiana ... | March 15 | 52 |
| Tidewater Will Build Refinery on Houston Channel .... | April 26 | 43 |
| San Antonio Petroleum Club Has Attractive Quarters ..... | May 3 | 128 |
| Committees to Decide Merger of Scouts Association ... *By H. H. King* | May 31 | 37 |
| Oil Well Supply Company Makes Personnel Changes ... | July 5 | 96 |
| Gasoline Tax Rates Increasing ..... | July 12 | 69 |
| Spain Will Pay Americans for Seized Property ..... | July 19 | 53 |
| New Gasoline Tax Law in Effect in Texas ..... | July 19 | 61 |
| Baker Oil Tools to Make Fishing Tools Under Yungling Patents ..... | July 26 | 232 |
| Amarillo Helium Plant Has Big Output ..... | Aug. 23 | 32 |
| New York University Offers Oil Course ..... | Sept. 27 | 98 |
| Exposition Equipment Directory International Petroleum Exposition, Tulsa, Oct. 5-12 ..... | Oct. 4 | 131 |
| Modern Field Equipment Display I. P. E. Tulsa, Oct. 5-12 ..... | Oct. 11 | Pages 50 to 179 |
| Acceptance of Industry Behind Success of Exposition .. | Oct. 18 | 24 |
| Eighteen Nations Represented at Petroleum Congress .. | Oct. 18 | 24 |
| Standard Unit Reported Buying Waggoner Ranch for $75,000,000 ..... | Oct. 18 | 43 |
| Million Barrels Burbank Oil Sold to Vacuum ..... | Oct. 18 | 43 |
| Western University Offers Oil Field Training ..... | Nov. 1 | 63 |
| Fall to Continue to Fight Bribe Acceptance Charge ... | Nov. 1 | 76 |
| Attempts to Control Gas Well Prove Futile ..... | Nov. 8 | 72 |
| Sharp New Independent Oil and Gas Company President ..... | Nov. 22 | 63 |
| "Not Time Yet for Optimism"—W. N. Davis ..... | Nov. 29 | 39 |
| Details of Tide Water's New Diesel Tankers ..... | Dec. 13 | 126 |
| Insull Gains Control of Pecos Valley Utility ..... | Dec. 27 | 70 |

### LAW AND LEGISLATION

| | | |
|---|---|---|
| Transfer of Section 36 (Elk Hills) Held Invalid ..... | Jan. 11 | 46 |
| Texas Law Removes University Land From Market .... | Jan. 18 | 46 |
| Rejected Bidder Protests Royalty Oil Award ..... | Jan. 18 | 58 |
| Economic Waste is Not Waste in Proposed Law ..... | Feb. 15 | 46 |
| Howard Urges Oil Tariff Before Committee ..... | March 1 | 62 |
| Oklahoma Independents Make Plea for Tariff on Oil .. | March 1 | 62 |
| Framing Bill to Restrict California Output ..... | March 8 | 46 |
| Conservation Bill Being Drawn at California ..... | March 15 | 54 |
| Oregon Basin Price Suit Appealed by U. S. ..... | March 15 | 74 |
| New Mexico Begins Sale of Oil Rights Under New Act ..... | April 5 | 42 |
| Drilling Without Permit Obtains No Rights ..... | April 19 | 39 |
| Cancellation of Osage Lease Goes to Supreme Court .. | April 26 | 62 |
| Kansas Royalty Owners Favor Oil Tariff ..... | May 3 | 118 |
| Pending California Law Legalizes Curtailment Agreement ..... *A. L. Weil* | May 17 | 29 |
| California Bill Passes House ..... | May 17 | 113 |
| Louisiana Department Knows About State's Oil and Gas ..... *By Wallace Davis* | May 24 | 27 |
| Congressmen Ask Duty on Crude Oil Imports ..... | May 24 | 64 |
| New California Oil and Gas Law Seen as Conservation Move ..... | May 31 | 27 |
| Governor Signs New Gas Law In California ..... | June 7 | 56 |
| "Independent Petroleum Association Will Oppose Closing of Government Lands and Favor Tariff on Crude Oil ..... | June 21 | 23 |
| Legal Action to Prevent California Waste ..... | July 5 | 60 |
| Court Gives Decision on Waggoner Versus Sigler ..... | July 5 | 66 |
| American Producers in Foreign Fields Oppose Oil Tariff ..... *By C. L. Lins* | July 19 | 23 |
| Shipping Board Helps Beat Oil Tariff ..... | July 19 | 61 |
| Threat of Senate Investigation Injected in Tariff Fight ..... | July 26 | 220 |
| Adoption of Duty on Petroleum Unlikely ..... | Aug. 16 | 41 |
| Time for Administration of New Law Draws Near .... | Aug. 16 | 41 |
| Constitutionality Upheld in Severance Tax ..... | Aug. 16 | 64 |
| Court Action to Force Gas Law Observance in California ..... *By Brad Mills* | Sept. 13 | 21 |
| Oil Industry Gets Hearing Before Kansas Tax Body .. | Sept. 20 | 55 |
| Santa Fe Springs Operators Cited in Gas Waste Suit. | Sept. 20 | 80 |
| Legislative Restrictions Modified, Roumanian Oil Industry Expanding—Interview with Nic N. Stefanescu ..... | Oct. 4 | 121 |
| Naval Reserve Lease Suit in Los Angeles Court ..... | Dec. 13 | 286 |
| Court Renders Decision Adverse to Waggoner ..... | Dec. 13 | 360 |

### PERSONAL PICTURES

| | | |
|---|---|---|
| R. S. McKeever ..... | Jan. 4 | 58 |
| B. B. Williams ..... | Jan. 4 | 101 |
| F. H. Thomas ..... | Jan. 4 | 101 |
| Z. E. Taylor ..... | Jan. 4 | 101 |
| H. A. Gehres ..... | Jan. 4 | 101 |
| N. L. Daney ..... | Jan. 4 | 101 |
| J. L. Shakely ..... | Jan. 4 | 102 |
| Robert McCoy ..... | Jan. 4 | 102 |
| O. A. Griffey ..... | Jan. 4 | 102 |
| J. J. Bisett ..... | Jan. 18 | 46 |
| R. O'Garrio ..... | Jan. 11 | 40 |
| H. E. Bell ..... | Jan. 11 | 43 |
| Leonard E. Vaughn ..... | Jan. 11 | 43 |
| Harry M. Taylor ..... | Jan. 11 | 43 |
| R. L. Welch ..... | Jan. 25 | 43 |
| P. C. Jones ..... | Jan. 25 | 102 |
| Fred J. Grace ..... | Feb. 1 | 86 |
| L. G. E. Bignell ..... | Feb. 1 | 40 |
| J. S. Terry ..... | Feb. 15 | 99 |
| Joe Dawson ..... | Feb. 15 | 99 |
| J. C. Julian ..... | Feb. 15 | 99 |
| Ed. J. Drake ..... | Feb. 15 | 102 |
| James J. Curran ..... | Feb. 15 | 102 |
| Sheldon Hardin ..... | Feb. 22 | 95 |
| E. H. Slavin ..... | Mar. 8 | 60 |
| Ernest J. Nickols ..... | Mar. 15 | 66 |
| Capt. James A. Goodwin ..... | Feb. 8 | 21 |
| Roy E. Leigh ..... | Feb. 8 | 26 |
| E. M. Watkins ..... | Feb. 8 | 50 |
| F. K. Harris ..... | Feb. 15 | 46 |
| R. J. Riggs ..... | Mar. 15 | 76 |
| J. W. Steel ..... | Mar. 22 | 51 |
| E. P. Angus ..... | Mar. 22 | 52 |
| D. A. Little ..... | Mar. 22 | 52 |
| Ralph H. Kinsloe ..... | Mar. 22 | 52 |
| George Blardone ..... | Mar. 22 | 122 |
| Lon Riggs ..... | Mar. 22 | 123 |
| J. A. Talbot ..... | Mar. 29 | 58 |
| C. M. Fuller ..... | Mar. 29 | 58 |
| F. C. Van Dunse ..... | April 5 | 44 |
| C. W. Murchison ..... | April 12 | 53 |

| | Date, 1929 | Page |
|---|---|---|
| A. S. Field | April 12 | 53 |
| C. H. L. Kent | April 12 | 53 |
| John R. Suman | April 12 | 53 |
| Jack Pew | April 12 | 53 |
| Charles Fitzgerald | April 12 | 53 |
| Joe H. Russell | April 12 | 53 |
| Frank Woods | April 12 | 53 |
| R. A. Wilson | April 12 | 53 |
| W. W. Scott | April 12 | 53 |
| W. C. Thomas | April 12 | 53 |
| Joe I. Cromwell | April 22 | 92 |
| Frank A. Herald | April 26 | 50 |
| Jim A. Bermingham | May 3 | 88 |
| W. J. Haley | May 3 | 91 |
| F. J. Shaver | May 3 | 91 |
| W. L. Maylor | May 3 | 92 |
| E. A. Wetmore | May 3 | 92 |
| C. E. Craddock | May 3 | 110 |
| C. C. McDermond | May 17 | 34 |
| Robert Allen & W. A. Osborne | May 17 | 34 |
| Vincent Vandiver | May 17 | 34 |
| Judson Wood & R. H. Lawrence | May 17 | 34 |
| H. E. Allen | May 3 | 133 |
| Lloyd Defenbaugh | May 3 | 133 |
| Fred Tieman | May 3 | 133 |
| Leo J. Hewitt | May 3 | 134 |
| W. L. Martin | May 3 | 134 |
| Homer Thornhill | May 3 | 134 |
| E. W. Hobson | May 3 | 134 |
| B. R. Emrick | May 10 | 53 |
| M. A. Hardie | May 10 | 53 |
| J. H. McEvoy, Sr. | May 17 | 60 |
| W. F. Chisholm | May 24 | 27 |
| M. E. Nash | May 24 | 27 |
| K. C. Jones | May 24 | 27 |
| Ray R. Irwin | May 24 | 48 |
| W. F. Taylor | May 31 | 49 |
| Sir Thomas H. Holland | June 7 | 36 |
| Dr. H. Foster Bain | June 7 | 36 |
| Dr. Aurel Ianculesco | June 7 | 36 |
| J. W. Steele | June 7 | 36 |
| Sr. Santiago Gonzales Cordero | June 7 | 36 |
| Jose Amador Iberra | June 7 | 37 |
| M. C. Anderson | June 7 | 37 |
| C. S. T. Folsom | June 7 | 37 |
| R. I. Dodson | June 7 | 37 |
| Capt. J. W. Flanagan | June 7 | 37 |
| C. F. Waite | June 7 | 122 |
| Mark L. Requa | June 14 | 26-C |
| Frederic Ewing | June 14 | 36 |
| Richard Tinsley | June 14 | 36 |
| S. H. Cathcart | | |
| Vincent Vandiver | | |
| Claude C. Brown | June 7 | 25 |
| B. F. Harris | June 14 | 119 |
| Harry Thrarlkill | June 14 | 110 |
| J. T. French | June 21 | 37 |
| I. N. Randall | June 21 | 37 |
| George A. Schwab | June 21 | 64 |
| R. J. Keown | June 28 | 99 |
| W. L. Moody | June 28 | 62-63 |
| O. R. Seagraves | June 28 | 62-63 |
| J. F. Reed | June 28 | 62-63 |
| N. W. Hundler | June 28 | 62-63 |
| A. C. Howard | June 28 | 62-63 |
| N. N. Oille | June 28 | 62-63 |
| Alba H. Warren | June 28 | 62-63 |
| B. A. Hardey | June 28 | 62-63 |
| L. A. Nordan | June 28 | 62-63 |
| M. A. Hardie | June 28 | 62-63 |
| B. A. Myers | July 5 | 74 |
| L. B. Denning | July 12 | 48 |
| A. S. Field | July 12 | 63 |
| T. H. Barton | July 19 | 50 |
| Charles Krause | July 19 | 52 |
| Bradford M. Melvin | July 26 | 142 |
| Tom E. Cranfill | July 26 | 153 |
| C. B. McKinney | July 26 | 156 |
| Paul Yungling | July 26 | 232 |
| Glenn D. Robertson | Aug. 2 | 60 |
| H. E. Cassidy | Aug. 2 | 72 |
| William Bennett McCormick | Aug. 2 | 74 |
| H. W. McCue | Aug. 2 | 81 |
| Gage Lund | Aug. 2 | 81 |
| H. M. Lemix | Aug. 2 | 81 |
| Billie Humphreys | Aug. 2 | 81 |
| E. Ballanfonte | Aug. 2 | 81 |
| H. J. Corcoran | Aug. 9 | 57 |
| W. B. Way | Aug. 16 | 49 |
| Jim Morgan | Aug. 16 | 64 |
| B. R. Emrick and J. M. Missone | Aug. 16 | 84 |
| B. E. Hull | Aug. 23 | 25 |
| D. B. Dow | Aug. 23 | 48 |
| J. C. McCue | Aug. 23 | 60 |
| S. R. Kimberly | Aug. 30 | 110 |
| Bob Ames | Aug. 30 | 110 |
| Amos X. Beatty | Sept. 6 | 79 |
| R. J. Daugherty | Sept. 6 | 96 |
| L. F. Payne | Sept. 6 | 144 |
| Randall McKown | Sept. 6 | 144 |
| Wm. J. Millard | Sept. 13 | 48 |
| L. W. Rowsey | Sept. 13 | 110 |
| Jack Dodson | Sept. 13 | 110 |
| George S. Davison | Sept. 20 | 64 |
| W. Ridley | Sept. 27 | 48 |
| E. B. Collidge | Oct. 4 | 116 |
| Roy E. Collom | Oct. 4 | 224 |
| Robert Burnett | Oct. 4 | 286 |
| W. G. Guiss | Oct. 11 | 189 |
| G. L. Chastain | Oct. 25 | 48 |
| A. B. Swain | Oct. 25 | 48 |
| H. D. Easton | Nov. 1 | 30 |
| Wirt Franklin | Nov. 1 | 47 |
| Judge E. D. Rector | Nov. 8 | 24 |
| W. N. Davis | Nov. 15 | 65 |
| E. B. Reeser | Nov. 15 | 65 |
| W. E. Taylor | Nov. 15 | 110 |
| Val. R. Wittick, Jr. | Nov. 15 | 110 |
| R. S. Sharp | Nov. 22 | 63 |
| J. H. Dye | Nov. 22 | 70 |
| Art White | Nov. 29 | 35 |
| T. J. Spikes | Nov. 29 | 110 |
| W. N. Davis | Dec. 13 | 57 |
| E. B. Reeser | Dec. 13 | 57 |
| P. H. Heeney | Dec. 13 | 168 |
| A. T. Beazley | Dec. 13 | 254 |
| C. J. Anderson | Dec. 13 | 362 |
| C. E. Richards | Dec. 13 | 366 |
| W. W. Fondren, Jr. | Dec. 13 | 11 |
| Otto Bradford | Dec. 20 | 27 |
| Tom Vaughn | Dec. 20 | 27 |
| H. H. Fitzpatrick | Dec. 27 | 27 |
| F. C. Sealey | Dec. 27 | 27 |
| C. P. Dimit | Dec. 27 | 47 |


# Field Development and Exploration


### PROVEN FIELDS AND EXTENSIONS—GENERAL

| | | |
|---|---|---|
| Field Activity at Highest Rate During January<br>*By H. J. Struth* | Feb. 22 | 64 |
| Important Development Follows Kentucky Oil Discovery | Sept. 27 | 35 |
| Fields Decline Rapidly From Peak | Nov. 22 | 38 |

### MOUNTAIN STATES

| | | |
|---|---|---|
| News From Rocky Mountain Fields | Jan. 4 | 62 |
| Cat Creek Royalty Oil Gets $1.01 Premium | Jan. 11 | 66 |
| Pondera Activity Halted by Winter | Jan. 25 | 70 |
| News From Rocky Mountain Fields | Feb. 8 | 72 |
| News From Rocky Mountain Fields | Feb. 15 | 66 |
| Restricted Drilling in Mountain Area Because of Market Conditions<br>*By A. J. Haslett* | Feb. 22 | 119 |

### OKLAHOMA GENERAL

| | | |
|---|---|---|
| Oklahoma Well, Average | Jan. 4 | 35 |
| Oklahoma Will Average Down at Mid-Year<br>*By Wallace Davis* | Jan. 4 | 34 |
| Oklahoma Production Limits Set at 650,000 Barrels | Feb. 8 | 38 |
| Curtailment Brings Oklahoma Down With Mission Open | Feb. 22 | 88 |
| 13 Companies Produce 64 Per Cent of Oil in Oklahoma | March 1 | 66 |
| No Immediate Production Increase to Be Expected in Oklahoma | June 7 | 50 |
| Kelly Pool With Three Producing Sands Looks Promising | June 21 | 52 |
| Wilcox Sand Producer Between Wewoka and Allen Pools | June 28 | 106 |
| Sasakwa Pool Assumes Importance as Producing Area | July 12 | 58 |
| Active Crude Demand Encourages Oklahoma Field Work<br>*By Warren Baker* | July 26 | 76 |
| Big Development Program to Follow Southern Oklahoma Discovery | July 26 | 145 |
| Westward and Deeper is Trend in Oklahoma<br>*By Warren Baker* | Oct. 4 | 208 |
| Oklahoma Operators Favor Non-Percentage Curb | Oct. 25 | 49 |
| Oklahoma Production Slightly Above Proration Quota | Nov. 8 | 53 |

### WESTERN OKLAHOMA

| | | |
|---|---|---|
| Western Oklahoma Has Important Potentialities When Oil Is Needed<br>*By Warren Baker* | Feb. 22 | 57 |
| Western Oklahoma Revealed As Important Reserve<br>*By Warren Baker* | Feb. 22 | 109 |
| Western Oklahoma Still Increasing In Activity | March 15 | 76 |

### OKLAHOMA

#### SEMINOLE

| | | |
|---|---|---|
| Potential Test Shows Seminole Peak; Sunday Plan Cuts It | March 8 | 64 |
| Seminole Makes Unexpected Showing on Proration Test | March 22 | 59 |
| New Pool Opened in Seminole Area; Oklahoma City Well Still Wet | April 12 | 73 |
| Seminole Operators Extend Shut-Down With Little Talk | April 12 | 65 |
| Houston Line Production of St. Louis Extended Mile North | April 26 | 54 |
| Seminole Slump Revealed When Proration is Little | May 24 | 54 |
| Seminole Area Will Hold Inter-Company Safety Contest | May 10 | 52 |
| St. Louis-Pearson Area Coming Rapidly to Forefront<br>*By Warren Baker* | July 12 | 35 |
| St. Louis and Earlsboro Most Active in Seminole Area | Sept. 6 | 83 |
| Area West of Pearson Switch Intrigues | Sept. 13 | 50 |
| Earlsboro South Extension Gets Best Well | Sept. 30 | 68 |
| Sasakwa Field Seems Defined to Southwest and Northeast | Sept. 20 | 72 |
| East Earlsboro Cut 50 Per Cent by Commission Order<br>*By Grady Triplett* | Oct. 4 | 53 |
| Deepened St. Louis Well Yields 1363 Barrels | Oct. 4 | 207 |
| Earlsboro Open Flow Test Shows But Slight Drop | Oct. 11 | 193 |
| Water Intrusion Feared in East Earlsboro | Nov 29 | 66 |
| Greater Seminole Area Extended to Southwest | Dec. 13 | 276 |

#### OKLAHOMA CITY

| | | |
|---|---|---|
| Second Oklahoma City Test Nears Gas Sand<br>*By Warren Baker* | Jan. 4 | 43 |

| | Date 1929 | Page |
|---|---|---|
| Restrictions Lifted—Mission Has Many Wells on Sand | Feb. 22 | 81 |
| Oklahoma City Pool Has 37 Tests Drilling; Limitation Planned | March 1 | 50 |
| Oklahoma City Crude in Demand for Its Quality *By Warren Baker* | March 15 | 37 |
| Decline in Oklahoma City Deep Well Continues | March 15 | 62 |
| Shallow Sands Dim Chance of Major Pool at Oklahoma City | March 29 | 54 |
| Salt Water Condemns Shallow Sands at Oklahoma City | April 5 | 56 |
| Completions Soon Due to Determine Oklahoma City Value | May 3 | 78 |
| Five Producers Prove Oklahoma City Pool Over Mile Length | July 5 | 70 |
| New Oklahoma City Producer Holds Depth Record For State | July 19 | 46 |
| Oklahoma City Extension Gives Area Greater Promise | Aug. 2 | 54 |
| Oklahoma City Operators Will Hold Output to Shipping Facilities | Aug. 16 | 51 |
| Oklahoma City Increases Output Drilling and Water Intrusion | Aug. 23 | 54 |
| Big Producer Extends Oklahoma City Pool to North | Aug. 30 | 54 |
| Oklahoma City Extension Makes Curtailment More Imperative | Sept. 6 | 83 |
| Oklahoma City Rising Output Gets Official Action | Sept. 13 | 50 |
| Oklahoma City Shut-In Order Not to Halt Drilling *By Grady Triplett* | Sept. 20 | 37 |
| Second Producing Spot Opened in Oklahoma City Area | Sept. 20 | 66 |
| Oklahoma City Curtailment Brings Production Decline | Sept. 27 | 37 |
| Oklahoma City Active Despite Production Shut Down | Sept. 27 | 51 |
| Oklahoma City Southwest Well Showing Unfavorably | Oct. 4 | 204 |
| Failures Reverse Ideas on Size of Oklahoma City Area | Oct. 11 | 192 |
| Test Shows Oklahoma City Potential 100,000 Barrels | Oct. 18 | 50 |
| Revise Potential Estimate of Oklahoma City | Oct. 25 | 49 |
| Oklahoma City Output Being Held to Pipe Line Capacity | Nov. 1 | 50 |
| Oklahoma City Proration Proving Non-Injurious to Producers | Nov. 8 | 51 |
| Oklahoma City Producer Makes Record Flow | Nov. 15 | 53 |
| New Oklahoma Well Record Set at Oklahoma City | Nov. 22 | 53 |
| Two Extensions Enhance South End of Oklahoma City | Nov. 29 | 64 |
| Gauge Shows New High Output for Oklahoma City | Dec. 6 | 52 |
| North Part of Oklahoma City Field Showing Appreciable Water | Dec. 13 | 276 |
| Oklahoma City Producing Area Spreads Despite Curtailment *By Warren Baker* | Dec. 20 | 26 |
| Oklahoma City South Extension Well is Large Producer | Dec. 20 | 52 |
| Oklahoma City Potential Sets New Record for State | Dec. 27 | 48 |
| Oklahoma City Expected to Stop Magnolia Storage Withdrawals | Dec. 27 | 53 |
| **POTTAWATOMIE COUNTY** | | |
| Two Pottawatomie County Areas Increasing Activity | May 10 | 57 |
| Southwestern Pottawatomie County, Oklahoma | May 10 | 71 |
| Two New Pottawatomie Areas Appear Important | May 3 | 77 |
| Simm's Well Points New Pool in Pottawatomie County | April 19 | 50 |
| **ASHER POOL** | | |
| Much Drilling and More Leasing in New Asher Pool *By Warren Baker* | May 10 | 71 |
| Asher Pool Failures Remove Area as Possible Market Disturber | June 14 | 52 |
| **ALLEN POOL** | | |
| Producer May Mean Drilling Rush in Allen Field *By Warren Baker* | Jan. 18 | 43 |
| Deeper Drilling Revises Importance of Allen Pool in Oklahoma *By Warren Baker* | Aug. 9 | 74 |
| **MAUD POOL** | | |
| Water in Number of Tests Shows Maud Production Spotted | Feb. 8 | 59 |
| **MISSION** | | |
| Mission Operators Plan Prompt Work When Ban Lifts | Feb. 15 | 51 |
| **NEW MEXICO** | | |
| First Pennsylvanian Well on Rattlesnake | July 12 | 66 |
| Oil Production in Lea County Section Thought Gas Area | Aug. 23 | 52 |
| New Mexico Most Active Rocky Mountain Area | Oct. 4 | 220 |
| Fifth Producer Extends Hobbs Area Half Mile South | Oct. 4 | 228 |
| Majors Sponsor Hobbs Field Shut-Down | Oct. 18 | 38 |
| Complete Shut-Down Expected at Hobbs | Oct. 25 | 54 |
| State Halts Move to Restrict New Mexico Drilling *By H. H. King* | Nov. 1 | 24 |
| Lynch-State Pool Most Active New Mexico Area | Nov. 22 | 58 |
| Railroads Given Permission to Enter Lea County | Dec. 13 | 278 |
| New Mexico Operators Mark Time in Proven Areas | Dec. 27 | 31 |
| Deepening Increases Flow of New Mexico Well | Dec. 27 | 52 |
| **KANSAS GENERAL** | | |
| Activity Presages Banner Year for Kansas; Sedgwick Rising | March 1 | 51 |
| New Large Prospective Area is Added in Western Kansas | May 31 | 56 |
| Kansas Production Extended More to West | May 24 | 54 |
| New High Gravity Oil Field in Western Kansas | Aug. 2 | 56 |
| Water Intrusion Proves Sumner Area Probably Spotted | Aug. 23 | 56 |
| Sumner-Grant Area Discovery Well Stops Flowing | Sept. 6 | 84 |
| Wright Pool Extension May Start Drilling Campaign | Sept. 20 | 68 |
| Third Producer Completed in Ritz Field, McPherson County | Oct. 4 | 204 |
| Second Well Completed in the Voshell Area | Oct. 11 | 192 |
| Large Wells Completed in Ritz and Voshell Areas in Kansas | Oct. 18 | 50 |
| New Western Kansas Pool Opened by Continental | Nov. 15 | 54 |
| McPherson County Pool Opener Kansas' Best Producer | Nov. 22 | 53 |
| Voshell Pool Promises Major Developments | Nov. 29 | 66 |
| New Field in Sumner County; No Drilling Rush | Dec. 13 | 277 |
| Ritz Field Producer Recalls Old Times in Kansas | Dec. 20 | 54 |
| McPherson County Becomes Most Important Area | Dec. 27 | 48 |
| **MARION COUNTY** | | |
| Second Well Boosts Stock of Marion County | Feb. 8 | 59 |
| **SEDGEWICK COUNTY** | | |
| Sedgewick County Drilling Campaign Increasing Rapidly *By Warren Baker* | Jan. 11 | 29 |
| Sedgewick County Development to be Rapid | Jan. 18 | 44 |
| Sedgewick Success Starts Wide Activity in Kansas *By Warren Baker* | Feb. 1 | 35 |
| Sedgewick Extension Well Starts Drilling Campaign | Feb. 15 | 52 |
| Sedgewick County Revises Potential Importance of Kansas *By Warren Baker* | Feb. 22 | 117 |
| Future of Sedgewick Hangs on Pending Completions | March 29 | 56 |
| New Sedgewick Area Due for Quick Development | May 3 | 79 |
| Two New Producers in Robbins Pool Sedgewick County | July 12 | 59 |
| Lygrisse Extension Well Flowing High Gravity Oil | July 19 | 47 |
| Find Oil in Wilcox Sand in Sedgewick County | Sept. 13 | 51 |
| Sedgewick County Operators Agree to Curtailment | Oct. 4 | 195 |
| New Pool Discovered in Sedgewick County | Oct. 25 | 66 |
| Sedgewick County, Kansas, Completions | Nov. 11 | 29 |
| Sedgewick County Wildcat Test May Open New Pool | Dec. 6 | 52 |
| **VALLEY CENTER** | | |
| Valley Center Field Has 16 Wells Near Completion | March 15 | 64 |
| Valley Center Potential Drops With Week's Showing | March 22 | 60 |
| Valley Center Tests Shutting Down—Water Showing | April 5 | 60 |
| Valley Center Gets Another Extension Westward | Aug. 26 | 146 |
| Valley Center Passes Five Million Barrels During First Year | Aug. 16 | 52 |
| **TEXAS FIELDS** | | |
| **West Texas General—** | | |
| West Texas Price is Low—But it is the Price *By H. H. King* | Jan. 11 | 27 |
| Many Expected to Fly to Meeting of Oil Men at San Angelo *By H. H. King* | Jan. 18 | 55 |
| Subsurface Correlation Methods in Permian Basin *By Lon D. Cartright, Jr.* | Jan. 25 | 46 |
| Marland Operating Settles Pool Properties | March 1 | 46 |
| Contract Means Drilling in Church Field Area | March 1 | 52 |
| Southwestern Ward County Gets Second Well | March 8 | 52 |
| West Texas Operators Center on Light Oil Development | March 15 | 56 |
| South Pampa Completion Unusually Large | March 22 | 62 |
| Two New West Texas Pools; Sweet Oil of Light Gravity | April 12 | 76 |
| Ward County Well Opens New Type Producing Area | April 19 | 53 |
| Roberts-Settles Pool Production Below Proration Allowance | May 10 | 60 |
| Outside Success Stimulates Bryson Development *By H. H. King* | May 24 | 24 |
| Nine West Texas Wells Have Big Production Average | May 31 | 56 |
| Crude Advance Has No Effect on West Texas Recovery | June 7 | 48 |
| New Pecos County Pool Opened 19 Miles from Yates | June 21 | 50 |
| Gray County Output Doubled in Past Five Weeks | June 28 | 101 |
| Pecos County Will Have Big Wildcat Campaign | July 5 | 66 |
| Shallow Pool in Crockett County is Possible | July 12 | 52 |
| New Pecos County Area to Get Thorough Testing | July 19 | 43 |
| New Production Found Over Wide Area and at New Depth in West Texas *By H. H. King* | July 26 | 71 |
| Unit Control and Proration Pacts Limit West Texas Drilling *By H. H. King* | July 26 | 73 |
| Four Tests Drilling to Deep Big Lake Sand *By Wallace Davis* | July 26 | 84 |
| West Texas Operators Complete 1007 Wells During Year *By H. H. King* | July 26 | 88 |
| Another Oil Field Looms at El Dorado | July 26 | 162 |
| Portable Hydraulic Equipment Used in West Texas Deep Well Work *By Wallace Davis* | July 26 | 174 |
| Pecos County, West Texas, Has Series of Important Strikes | Aug. 2 | 43 |
| High Gravity Pool Opened in Northeastern Fisher County | Aug. 16 | 54 |
| Make Temperature Adjustment on West Texas Crude Purchases | Aug. 23 | 35 |
| Taylor-Link Pool Promises Big Flush Production | Aug. 23 | 51 |
| New Pecos County Areas Appear Probable Market Threats | Sept. 6 | 87 |
| Third Ward County Production Area in Prospect | Sept. 13 | 52 |
| New Pecos County Areas Start Drilling Rush | Sept. 13 | 54 |
| Pecos Pools Get Pipe Lines and Prorated Runs | Sept. 20 | 69 |
| Pecos County Development Progressing Rapidly | Oct. 4 | 211 |
| Second Well Gives Big Lake Deep Production More Importance | Oct. 18 | 52 |
| Three West Texas Pool Openers Better than First Believed | Oct. 18 | 56 |
| Failures Indicate Rowan-Tong Smaller Than Anticipated | Nov. 1 | 53 |
| Taylor-Link Production Climbs; Rowan-Tong Failures Continue | Nov. 8 | 50 |
| Another Producing Area Opened in Northern Pecos County | Nov. 15 | 56 |

| | Date 1929 | Page |
|---|---|---|
| Ector Drilling Rush Threatened; Settles Area Extended | Nov. 29 | 69 |
| World's Deepest Producer Enters Second Year | Dec. 6 | 56 |
| Taylor-Link Production Drops; Much Drilling in Prospect | Dec. 6 | 57 |
| Showing in Andrews County Test May Indicate Field | Dec. 13 | 278 |
| First Andrews County Producer Makes Sulphur Oil Flow | Dec. 20 | 55 |
| Lime Production Indicated in Shipley Pool Test | Dec. 27 | 51 |
| **NORTH AND WEST TEXAS GENERAL** | | |
| North and Central West Texas Areas Have Quiet Year. *By H. H. King* | Feb. 22 | 53 |
| Gray County Drilling Boom Showing Results | June 21 | 49 |
| Young County Discovery Gives Boost to Shallow Drilling | July 26 | 149 |
| Two Shallow Wells Practically Double Cooke County Production | Aug. 2 | 50 |
| New Well Shifts Trend of Pampa Proration | Aug. 2 | 51 |
| Skelly's Schafer Ranch Lease is an Active Property. *By Warren Baker* | Aug. 2 | 63 |
| Pampa-Lefours Production Passes Handling Facilities | Aug. 9 | 50 |
| Few Deep Tests Have Been Drilled in Interior Texas | Oct. 4 | 74 |
| University Leases in Ector County Scheduled for Early Drilling | Nov. 22 | 55 |
| **HOWARD-GLASSCOCK COUNTIES** | | |
| Howard-Glasscock County Wells Making Water | Jan. 4 | 44 |
| Humble Restricts Purchases of Howard-Glasscock Crude | Jan. 25 | 36 |
| Howard-Glasscock Proration Period Extended. *By H. H. King* | Feb. 1 | 39 |
| Glasscock-Settles Crudes Have One Posted Price | Feb. 8 | 60 |
| Rapid Water Encroachment Causes Howard-Glasscock Concern | March 22 | 61 |
| Howard-Glasscock Output Below Proration Allowance | June 14 | 64 |
| Howard-Glasscock County Tests Showing Favorably | Sept. 6 | 73 |
| Howard-Glasscock Extension Influences Proration | Oct. 11 | 198 |
| **DOUGHERTY POOL** | | |
| Ten Wells in Dougherty Pool; All Make Some Water | Feb. 8 | 62 |
| Developments Lessen Probability Llano and Dougherty Joining | Feb. 15 | 55 |
| **YATES POOL** | | |
| Yates Field Widened at Center; Well Making 400 Barrels an Hour. *By H. H. King* | Jan. 4 | 44 |
| Yates Proration Increased 15,000 Barrels by Commission | Jan. 18 | 39 |
| Yates Shallow Production Rivals Colonel Drake's Well. *By H. J. Struth* | April 12 | 60 |
| Yates Production Boosted to 100,000 Barrels by Commission. *By H. H. King* | May 5 | 48 |
| Commission Holds Hearing on Oil Seeps in Yates Field | May 17 | 49 |
| Yates Operators Agree to Increase Output on July 1 | June 7 | 48 |
| Humble Will Build Gasoline Plant in Yates Field | July 26 | 150 |
| Yates Field Surface Production Has Important Proportions | Aug. 16 | 87 |
| 203,000 Barrel Flow Sets New Record for Yates Field | Sept. 27 | 54 |
| Yates Potential Gauge Shows Above Five Million Daily | Oct. 4 | 211 |
| Yates Field is Adhering Closely to Proration | Oct. 11 | 180 |
| Yates Controlled Flow Keeps Water Trouble at Minimum | Dec. 6 | 55 |
| **WINKLER COUNTY** | | |
| North Winkler Takes Turn Favorable for Production | Jan. 11 | 33 |
| Water Encroachment Brings Vote on Winkler Curtilment. *By H. H. King* | March 1 | 46 |
| Three Wells Extend Winkler Field Quarter Mile | April 5 | 61 |
| Winkler Potential Estimates Above Actual. *By H. H. King* | April 26 | 49 |
| Winkler County Enters Second Year of Prorated Production | May 10 | 49 |
| Gasser Gives Winkler County New Theory on Production Trend | May 10 | 59 |
| Winkler County Proration Has Increased Recovery. *By H. H. King* | Aug. 2 | 35 |
| **HENDRICK AND O'BRIEN POOLS** | | |
| Hendrick and O'Brien Pools May Connect. *By H. H. King* | Jan. 18 | 39 |
| Hendrick South Extension Well Makes Strong Flow. *By H. H. King* | Jan. 25 | 37 |
| Drilling in Hendrick Pool Falling Off Steadily | Feb. 1 | 59 |
| Hendrick Oil Movement Hangs on Rate | March 1 | 56 |
| Atlantic Buys Hendrick Crude from Gulf | March 8 | 46 |
| Shreveport Plant Makes Contract for Hendrick Crude | Nov. 1 | 39 |
| **PANHANDLE** | | |
| Panhandle District in Stronger Market Position | Jan. 25 | 36 |
| Empire Buys Production of Rock Crossing | March 15 | 58 |
| Panhandle Production Increased by Week's Completions | March 29 | 64 |
| Texas Panhandle Gets Big Oil Producer | April 5 | 62 |
| New Wells Cause Production Rise in Texas Panhandle | June 7 | 49 |
| Gray County Completions Break Production Records | May 31 | 57 |
| Gray County High Gravity Producers Start Big Drilling Rush | June 14 | 48 |
| Gray County Production Expected to Increase | July 12 | 54 |
| U. S. Will Build Helium Plant Near Amarillo | July 12 | 66 |
| Gray Prduction at New Peak; Many Operations Under Way | July 19 | 44 |
| Gray County Operators Plan to Curtail Production | Aug. 23 | 52 |
| Gray County Curtailment Move Halts Production Rise | Sept. 6 | 80 |
| Gray County Decline Continues Despite Nine New Wells | Sept. 20 | 69 |
| Gray County Production Still Shows Heavy Decline | Sept. 27 | 52 |
| Panhandle Storage Runs Showing Decline | Oct. 25 | 54 |
| Gray County Producers Warned of Proration Possibility | Nov. 1 | 53 |
| Gray County Production and Purchases Cut by Texaco | Nov. 8 | 49 |
| Extension of Limitation on Gray County Crude Runs | Dec. 6 | 55 |
| More Rigid Restrictions Felt in Gray County | Dec. 20 | 55 |
| **WEST CENTRAL TEXAS** | | |
| Well in Eastland Sand Horizon Opens New Texas Pool | June 28 | 110 |
| Deep Producer in Jack County; Second Well in Cooke Area | July 19 | 44 |
| New Pool Opened in Young County | Oct. 4 | 199 |
| **TEXAS GULF COAST** | | |
| Gulf Coast Has Record Year Settled Output. *By Jack Logan* | Feb. 22 | 60 |
| New Texas Fault Field Typical Shoestrong Development. *By Jack Logan* | April 19 | 19 |
| New Pool Opened Between Orange Field and Spindle Top | May 17 | 72 |
| Gulf Opens New Liberty County Dome with 700 Barrel Well | June 14 | 60 |
| Discovery of Deep Domes Revises Gulf Coast Potentialities. *By Jack Logan* | July 26 | 80 |
| 200 Barrel Flow in Lost Lake Test Adds New Dome | August 9 | 59 |
| Two Wells Open New Dome Field in Liberty County | August 23 | 58 |
| Third Producing Sand Revealed at Liberty | Sept. 13 | 64 |
| Pure Running Seven Rigs at Lost Lake | Sept. 27 | 55 |
| Coast's Deepest Test Drilled Without Single Accident | Oct. 4 | 70 |
| Shell is Drilling Below 7000 Feet on Two Wells | Oct. 4 | 214 |
| Gulf Coast Fields Where Wells Have Been Drilled Below 5000 Feet | Oct. 4 | 234 |
| Sour Lake "Shoe-String" Section Falls into Cavities. *By Jack Logan* | Oct. 18 | 63 |
| Another Harris County Dome Indicated by Gas Sand | Dec. 13 | 282 |
| North Dayton Deep Production Extended Eastward | Dec. 20 | 59 |
| Completion at Port Neches Increases Production | Dec. 20 | 59 |
| Gulf Completes Producer at Fannett Dome | Dec. 27 | 54 |
| **NORTH TEXAS** | | |
| North Texas Extension to Foard County Seems Probable | June 14 | 65 |
| North Texas District Production Reaches New Peak | Aug. 9 | 41 |
| Cooke and Wilbarger Counties Set New Peaks | Aug. 16 | 56 |
| California Puts Price Handicap on North Texas Crude | Oct. 25 | 41 |
| Temperature Adjustment Now Common in North Texas | Nov. 22 | 56 |
| Wilbarger Operators Forced to Meet Lease Obligations | Dec. 20 | 56 |
| **EAST TEXAS** | | |
| Jasper County Shows Favorably for Commercial Production | Jan. 18 | 96 |
| Texas Faults Zone Field Work at Low Ebb in 1928. *By H. H. King* | Feb. 22 | 63 |
| Another East Texas Fault Field Indicated by Van Zandt Well. *By H. H. King* | Oct. 18 | 54 |
| Expect Quick Drilling on Three Offsets to Van Discovery | Nov. 15 | 57 |
| Prospects for Oil Production in Saline County Test | Nov. 1 | 50 |
| Van Zandt County Producer Starts New East Texas Campaign | Nov. 11 | 32 |
| Van Pool to have Three Completions Soon | Dec. 6 | 56 |
| Second Producer Confirms Van Area; Committee Plans More Tests | Dec. 13 | 262 |
| Van Has Four Completed Wells; Six More to Start | Dec. 20 | 58 |
| Van Field's Market Outlet Completed by Pure Oil | Dec. 27 | 52 |
| **SOUTHWEST TEXAS** | | |
| New Edwards Lime Field Near Luling Becoming Busy Spot. *By Jack Logan* | Jan. 4 | 31 |
| Gonzales County Production Differs from Neighboring Fields. *By Jack Logan* | Jan. 11 | 31 |
| Cedar Creek as Probably Important Production Source. *By A. R. McTee* | Jan. 18 | 37 |
| Gonzales County Crude Gets Market Outlet | Feb. 8 | 63 |
| Salt Flat Production Gets Big Boost | Feb. 15 | 59 |
| East Side of Llano Pool Gets Two More Producers | March 1 | 52 |
| Tests in Gonzales County Miss Production | March 8 | 53 |
| Salt Flat Field is Long and Flat Like Luling | March 8 | 63 |
| Maverick County Well Opens Entirely New Area. *By Jack Logan* | March 15 | 61 |
| Refugio Gas Field Originally Drilled for Oil. *By Jack Logan* | April 5 | 37 |
| Bring in Two More Wells at Refugio | April 5 | 64 |
| Salt Flat Ranks First in South and Southwest Texas | May 10 | 64 |
| Refugio Field is Extended by Mission Drilling Company | July 5 | 69 |
| Salt Flat Outstanding Feature in Southwest During Year. *By Jack Logan* | July 26 | 152 |
| The Texas Company Opens New Field in Guadalupe County | July 26 | 156 |
| Salt Flat Production Reaches New Peak During June | July 26 | 192 |
| Drilling Campaign Around Guadalupe County Wildcat | Aug. 2 | 53 |
| Darst Creek Operators to Curtail Drilling | Aug. 9 | 60 |
| Twenty Tests in Southwest Texas Drilled Below 5000 Feet. *By Richard A. Jones* | Aug. 16 | 21 |
| Refugio One of the Most Active Coast Fields | Aug. 16 | 60 |
| New Field Probable in Guadalupe County | Aug. 23 | 36 |
| Salt Flat Production Declines During July; Less In Demand | Aug. 23 | 56 |
| Lease Trades Follow Oil Strike in Guadalupe | Sept. 6 | 90 |
| Three Oil Wells and One Gasser Week's Results at Refugio | Sept. 6 | 91 |
| Salt Flat Production is Steadily Declining | Sept. 13 | 63 |

| | Date 1929 | Page |
|---|---|---|
| Plan Conservation Development for New Guadalupe Pool | Sept. 13 | 64 |
| Five Completions at Refugio; Production Extended | Sept. 20 | 73 |
| Salt Flat Field Shows Only Small Decline for Fault Pool | Sept. 27 | 64 |
| Refugio Field Active; Six Wells Completed | Oct. 11 | 201 |
| Salt Flat Recovery Nearly Eleven Million Barrels | Oct. 18 | 59 |
| Wildcat Completed on Manford-Darst Fault | Oct. 25 | 56 |
| Refugio Most Active Coastal Field | Nov. 1 | 58 |
| Salt Flat Production Lower During October | Nov. 22 | 38 |
| Gap is Shortened Between Darst Creek Producers | Dec. 13 | 290 |
| Additional Market Outlet for Refugio Provided | Dec. 27 | 57 |
| **RACCOON BEND** | | |
| Raccoon Bend Extended to Northeast | Jan. 11 | 41 |
| Raccoon Bend | March 15 | 27 |
| *By Jack Logan* | | |
| Important Extension at Raccoon Bend | March 29 | 61 |
| Raccoon Bend Production Boosted by Completions | April 26 | 61 |
| Raccoon Bend Has Five Completions in Week | July 26 | 154 |
| Five New Producers at Raccoon Bend | Sept. 27 | 56 |
| Raccoon Bend Registers Seven Wells in Week | Dec. 20 | 60 |
| **HUMBLE FIELD** | | |
| Deep Well at Humble Makes Flow of High Gravity Oil | Jan. 11 | 41 |
| Deep Producer at Humble Holding Up Flow | Feb. 1 | 61 |
| Third Well in New Deep Sand at Humble | May 10 | 62 |
| Old Humble Field Scene of Active Drilling | July 5 | 68 |
| Humble May Have Natural Gasoline Plant Soon | July 12 | 60 |
| Three Wells Completed in Humble Field | Oct. 18 | 58 |
| Humble Field Production Shows Downward Trend | Dec. 27 | 54 |
| **BARBERS HILL** | | |
| Second Well Producing From Deep Sand at Barbers Hill | Jan. 11 | 41 |
| Deep Production on Two Sides Give Barbers Hill More Promise | Feb. 8 | 64 |
| New Deep Well at Barbers Hill Holding Up Production | Feb. 15 | 58 |
| Importance of Barbers Hill Production Increasing | March 15 | 60 |
| Second Well on Southwest Flank of Barbers Hill | April 5 | 64 |
| Two Barbers Hill Wells Drill Together | May 10 | 62 |
| Deep Sands Throw New Light on Barbers Hill | June 28 | 34 |
| *By Jack Logan* | | |
| Barbers Hill Extended by New Completions | June 28 | 108 |
| Barbers Hill Extension Well Puts Production at New Peak | Aug. 2 | 57 |
| Barbers Hill Active; Production Increases | Aug. 9 | 59 |
| Barbers Hill is Forging Ahead Among Coastal Fields | Aug. 16 | 58 |
| Two New Pools at Barbers Hill Help to Hold Production Up | Aug. 30 | 58 |
| Barbers Hill Production Still on Upward Trend | Sept. 6 | 90 |
| Barbers Hill Output May Lead Gulf Coast | Sept. 13 | 63 |
| Barbers Hill Production Trend Continues Upward | Sept. 20 | 73 |
| Barbers Hill Gets Ample Line Outlet | Sept. 20 | 74 |
| Barbers Hill Semi-Wildcat Test Showing for Production | Oct. 4 | 214 |
| Active Flank Drilling at Barbers Hill | Oct. 11 | 202 |
| Tests Near Interesting Stage at Barbers Hill | Nov. 1 | 54 |
| Barbers Hill Production Equals Spindle Top | Nov. 22 | 59 |
| Two Wells Add 3600 Barrels Flush to Barbers Hill | Dec. 20 | 60 |
| Barbers Hill Soon to Have Several Completions | Dec. 27 | 54 |
| **CLAY CREEK** | | |
| Salt Water Appears in Clay Creek Field | Jan. 25 | 42 |
| Sun Company Gets Third Washington County Well | Feb. 1 | 60 |
| Start Four New Tests in Washington County | Feb. 8 | 66 |
| Development of Clay Creek Field Conservatively Conducted | March 1 | 54 |
| Slow up Development Work on Clay Creek Dome | April 19 | 55 |
| **SUGARLAND** | | |
| Eleventh Successful Well at Sugarland | March 1 | 55 |
| Sugarland Again Extends to Northeast | March 15 | 60 |
| Sugarland's Twelfth Producer Extends Field North | March 29 | 60 |
| 13 Completions Make 13 Producers at Sugarland | April 5 | 64 |
| Sugarland Now Third Rank in Gulf Coast | May 3 | 83 |
| Thirtieth Sugarland Completion is Field's First Failure | Aug. 2 | 57 |
| **ARKANSAS** | | |
| Drilling at Champagnolle Shows Appreciable Loss | Feb. 8 | 68 |
| Mount Holly District Appears New Arkansas Field | March 29 | 74 |
| Champagnolle and Cotton Valley Fields Extended | March 1 | 99 |
| Champagnolle's "Biggest Well" Makes Salt Water | April 5 | 74 |
| New Mount Holly Area Appears Much Like Champagnolle | April 12 | 67 |
| *By Wallace Davis* | | |
| Three Tests Threaten Extension of Champagnolle Area | April 12 | 80 |
| Offset to Mount Holly Discovery Shows Unfavorably | April 26 | 59 |
| Mount Holly Gets First Failure and Another Producer | May 3 | 107 |
| Two Arkansas Areas Have Revival of Activity | Aug. 16 | 62 |
| North Arkansas Geology Induces Oil Search | Sept. 6 | 95 |
| *By Warren Baker* | | |
| **LOUISIANA GULF COAST** | | |
| Drilling in Louisiana Takes Big Slump During Year | Jan. 11 | 48 |
| La Fourche Parish Dome Sulphur Deposit | Feb. 8 | 40 |
| Second and Third Producers at Hackberry Dome | Feb. 22 | 92 |
| Hackberry Dome Most Active South Louisiana Area | March 22 | 64 |
| New Section on Hackberry Dome Shows Possibilities | March 29 | 60 |
| Well Completed Between Stephens and Louann Fields | March 22 | 121 |
| The Texas Company has Show on Terrebonne Parish Dome | May 24 | 60 |
| New Depth Record Set at Evangeline; 5000 Barrels Initial | June 7 | 58 |
| Texas Company Having Good Success on Louisiana Domes | June 14 | 60 |
| Three Strikes Registered in Terrebonne Parish | July 5 | 69 |
| Test in Acadia Parish Breaks Two Records | July 19 | 45 |
| Third Terrebonne Parish Dome Verified by Well | July 26 | 154 |
| Old Anse La Butte is Brought Back to Life | Aug. 16 | 58 |
| Another South Louisiana Field Opened by The Texas Company | Sept. 22 | 55 |
| Hackberry Extended to the East | Sept. 27 | 56 |
| New Wells at Sulphur Dome Boost Output | Oct. 11 | 201 |

**CALIFORNIA**

**GENERAL**

| | Date 1929 | Page |
|---|---|---|
| Los Angeles Basin Fields Marking Time | Jan. 18 | 42 |
| Los Cerritos Extension Gets Good Well | Feb. 15 | 64 |
| California Stocks Rise Sharply in December | Feb. 22 | 124 |
| Production Gain Slackened by California Decline | March 8 | 40 |
| Santa Barbara Oil Strike Shows Marks of Importance | May 31 | 52 |
| California Solely Responsible for Rising Production | June 21 | 39 |
| Gulf May Have Found a New High Gravity Field | July 12 | 56 |
| California Yield to Stay Above 800,000 in 1929 | July 26 | 171 |
| California Permits Ahead of Last Year | Aug. 2 | 70 |
| California Decline Forces Drop in Production | Aug. 16 | 39 |
| Gas Waste in California Forms Standard Oil Bulletin | Aug. 30 | 78 |
| California Supervisor Makes New Attack on Gas Waste | Oct. 11 | 207 |
| Pacific Ocean Field May Yield Considerable Oil | Oct. 11 | 208 |
| Independents' Resolution Seen as Step Toward Curtailment | Oct. 18 | 66 |
| 200 Wells Drilling for Lower Clarke Zone | Oct. 25 | 64 |
| Agreement Proposes Drastic Cut in California Output | Nov. 8 | 23 |
| *By Brad Mills* | | |
| California Prices Restored When Production Declines | Nov. 15 | 35 |
| *By Brad Mills* | | |
| Big Well Gives Impetus to Maricopa Flats Activity | Nov. 15 | 68 |
| California Curtailment Came When All Tanks Were Full | Nov. 22 | 67 |
| California Gain Reverses Production Trend | Nov. 29 | 53 |
| Geologists Place Little Importance on Englewood | Nov. 29 | 80 |
| Extension and Strengthening of Curtailment Underway | Dec. 6 | 65 |
| California Situation Critical Due to Expected Flush | Dec. 27 | 60 |

**CALIFORNIA FIELDS**

**BAKERSFIELD**

| | | |
|---|---|---|
| Leasing Over Wide Area North of Bakersfield | Jan. 4 | 58 |
| 90 Small Wells in Lost Hills to Be Opened | Dec. 6 | 64 |

**LONG BEACH**

| | | |
|---|---|---|
| Long Beach Production Holding Up | Jan. 18 | 76 |
| Long Beach Production Increased | Jan. 25 | 58 |
| Long Beach Output Held Steady During Week | Feb. 1 | 58 |
| Redevelopment of Long Beach Gives California Production Boost | Feb. 22 | 127 |
| *By Brad Mills* | | |
| Long Beach Production Still Holding Up | March 1 | 56 |
| Long Beach Yield Up to 195,000 Barrels | April 26 | 52 |
| Long Beach Stability An Incentive to Curtailment | Oct. 11 | 47 |
| *By H. J. Struth* | | |

**SANTA FE SPRINGS**

| | | |
|---|---|---|
| Decline Tends to Offset New Wells at Santa Fe Springs | Jan. 4 | 51 |
| *By Brad Mills* | | |
| Buckbee Again Favored Objective at Santa Fe Springs | Jan. 11 | 45 |
| *By Brad Mills* | | |
| Santa Fe Springs Reaches New Production Peak | Jan. 18 | 41 |
| Big Wells Again Boost Output at Santa Fe Springs | Jan. 25 | 52 |
| *By Brad Mills* | | |
| Decline of Deep Wells Fails to Halt Santa Fe Springs | Feb. 1 | 56 |
| New Sand at Santa Fe Springs; Smaller Wells Completed | Feb. 8 | 56 |
| Two New Sands Postpone Probable Drop at Santa Fe Springs | Feb. 15 | 62 |
| New Oil Zone Found at 6610 Feet at Santa Fe Springs | Feb. 22 | 89 |
| Have Hopes of Handling Water Problem in O'Connell Sand | March 1 | 58 |
| Seventh Santa Fe Springs Sand Found at 7800 Feet | March 8 | 57 |
| Limitation of Deep Drilling Still Debated at Santa Fe Springs | March 15 | 67 |
| Santa Fe Springs Takes Further Tumble | March 22 | 55 |
| Santa Fe Springs Prospects Revived by O'Connell Sand Wells | March 29 | 68 |
| O'Connell Zone Wells at Santa Fe Springs Cause Apprehension | April 5 | 75 |
| Heat Makes Serious Cement Problem at Santa Fe Springs | April 12 | 81 |
| Santa Fe Springs Production Takes Another Drop | April 19 | 59 |
| Better Showing of O'Connell Raises Santa Fe Springs Output | April 26 | 51 |
| Bulk of Santa Fe Springs' New Wells in O'Connell Zone | May 24 | 51 |
| Big Wells Send Santa Fe Springs Production Up | May 13 | 51 |
| Santa Fe Springs Boosts National Production to New Peak | June 7 | 39 |
| Santa Fe Springs Production Nearing Peak | June 7 | 53 |
| New Depth and New Peak at Santa Fe Springs | June 14 | 55 |
| Santa Fe Springs Production Holds Up Despite Fire Loss | June 21 | 56 |
| Relief from O'Connell Zone Flood Expected in Six Weeks | June 28 | 103 |
| Santa Fe Springs Passes 250,000 Barrels for new Peak | July 5 | 59 |
| Santa Fe Springs Gets Another Boost; Decline May Start Soon | July 12 | 55 |
| Santa Fe Springs Reaches New Peak and Declines Slightly | July 26 | 163 |
| Preliminary Report of the Deep Zones Recently Developed in the Santa Fe Springs Field | August 2 | 27 |
| *By Rolla Walling* | | |
| Santa Fe Springs Production Drops 15,000 Barrels | August 2 | 69 |
| Rush of Drilling Starts for Third Clarke at Santa Fe Springs | August 9 | 64 |
| Many New Wells Started for Lower Clarke Zone at Santa Fe Springs | August 16 | 67 |
| Gas Law May Stop Drilling Third Clarke at Santa Fe Springs | August 23 | 66 |
| Deeper Wells Become Productive Factor at Santa Fe Springs | August 30 | 47 |
| Santa Fe Springs Production Takes Sharp Drop | Sept. 6 | 92 |
| Santa Fe Springs Yield Higher Than Expected | Sept. 13 | 57 |
| Santa Fe Springs Production Takes Upward Turn | Sept. 20 | 81 |
| Deep Sand Wells Boost Output of Santa Fe Springs | Sept. 27 | 66 |
| O'Connell Zone Decline Causes Santa Fe Springs Drop | Oct. 4 | 222 |
| Clarke Zone May Reach 140,000 Barrels Soon | Oct. 11 | 209 |

| | Date 1929 | Page |
|---|---|---|
| Santa Fe Springs Feels Temporary Lull | Oct. 18 | 68 |
| Deeper Drilling May Reveal Other Productive Zones for Santa Fe Springs *By Brad Mills* | Oct. 25 | 26 |
| Santa Fe Springs Initial Output Shows Decline | Nov. 1 | 64 |
| Difficulty With Clarke Zone Shows Santa Fe Springs Completions | Nov. 8 | 72 |
| Santa Fe Springs Drilling Unaffected by Curtailment | Nov. 15 | 68 |
| Rapid Drilling Keeps Santa Fe Springs a Sore Spot *By Brad Mills* | Nov. 29 | 48 |
| Expect 100 Completions at Santa Fe Springs Soon | Dec. 13 | 286 |
| **LAWNDALE** | | |
| Hawthorne-Lawndale Areas Has Lease Boom | Jan. 25 | 54 |
| Lawndale Becomes Real Active Area | Feb. 15 | 64 |
| Four Lawndale Tests Are Below Production Level | March 8 | 96 |
| Trend of Production at Lawndale Uncertain | March 15 | 68 |
| Too Many Tests Below Sand Level at Lawndale | March 22 | 56 |
| Affairs at Lawndale Take on Better Appearance | March 29 | 68 |
| Lawndale Well Settles to 650 Barrels | April 5 | 76 |
| **SEAL BEACH** | | |
| Seal Beach Shows Signs of Needing Proration | April 12 | 83 |
| **KETTLEMAN HILLS** | | |
| Kettleman Hills Development Over Wide Area | Jan. 18 | 42 |
| Work Started on New Tests at Kettleman Hills | Jan. 4 | 52 |
| New Locations Made at Kettleman Hills | Jan. 25 | 54 |
| Confine Kettleman Hills Work to Preliminaries | Feb. 1 | 58 |
| Kettleman Hills Drilling Wells Increased | Feb. 8 | 58 |
| Showing of High Gravity Well Encourages Offsets | Feb. 15 | 50 |
| Kettleman Hills Drilling to Be Orderly | Feb. 22 | 90 |
| Kettleman Hills Busy With Preliminaries | March 1 | 60 |
| General Petroleum Leads at Kettleman Mills | March 8 | 58 |
| Kettleman Hills Activity Shows Increase | March 22 | 56 |
| Kettleman Hills High Pressure Area Proves Interesting Development *By Brad Mills* | March 22 | 26 |
| Source of Wells' Production at Kettleman Hills In Doubt | April 12 | 84 |
| Hard Formation Slows Kettleman Hills Wells | May 31 | 52 |
| Big Gas Well Wild Off Kettleman Hills | May 10 | 54 |
| Rush Work on Project in Kettleman Hills Area | June 28 | 104 |
| Kettleman Curtailment Meeting Ended in Deadlock | July 26 | 166 |
| Kettleman Hills Facing Two Year Suspension | August 16 | 72 |
| Kettleman Hills Active Despite Curtailment Agreement | Sept. 6 | 92 |
| Wild Well at Kettleman Hills Defies Crew | Sept. 13 | 58 |
| Complete Shut-down Finally Effected at Kettleman Hills | Sept. 27 | 67 |
| Kettleman Hills Well Sets High Gravity Oil Production Record | Oct. 4 | 222 |
| South Dome of Kettleman Hills Disappointing | Oct. 11 | 208 |
| Kettleman's South Dome Suffers Severe Blow | Oct. 18 | 69 |
| 7000 Barrels is Output of Kettleman Hills Well | Oct. 25 | 64 |
| Kettleman Hills Quiet as Shut-down is Effected | Nov. 1 | 64 |
| Potentiality of Kettleman Hills Less Alarming | Nov. 8 | 70 |
| Kettleman Hills Progress Encouraging | Nov. 15 | 70 |
| New Kettleman Hills Wells Tend to Show Prospective Limits | Nov. 22 | 68 |
| Kettleman Hills Projects Remove Apprehension | Nov. 29 | 60 |
| Operators Find Drilling Slow at Kettleman Hills | Dec. 6 | 67 |
| Kettleman Hills Retarded by Shut-in Agreement | Dec. 13 | 286 |
| Importance of Kettleman Hills North Dome Pending | Dec. 20 | 64 |
| South Dome Outlook Dim at Kettleman Hills | Dec. 27 | 61 |
| **VENTURA** | | |
| Ventura Field Has Two Good Completions | Jan. 25 | 70 |
| Operations at Ventura Holding Steady Pace | Feb. 1 | 97 |
| Ventura Production Rises Despite Curtailment | Feb. 8 | 58 |
| Ventura Wells Smaller in January and February | March 8 | 46 |
| Ventura Well Action Questions Economics of Pinching *By Brad Mills* | March 29 | 19 |
| Ventura South Extension Disappointing | April 19 | 62 |
| Improved Control Head Handles High Pressure at Ventura *By Brad Mills* | April 12 | 41 |
| Ventura Output Is Up as Restrictions are Lifted | June 28 | 104 |
| Late Ventura Completions not Very Profitable | Nov. 1 | 64 |
| Gradual Decline Expected at Ventura Avenue | Nov. 15 | 68 |
| Ventura Avenue Eliminates Large Gas Waste *By Brad Mills* | Dec. 13 | 285 |
| **RINCON** | | |
| Rincon Production Drops to 3600 Barrels | Jan. 25 | 70 |
| Interest in Rincon Field Continues to Lag | Feb. 8 | 58 |
| Rincon Deep Test Fails Near 7000 Feet | Feb. 15 | 64 |
| **KERN COUNTY** | | |
| Kern Front Drilling Held in Line Wells | June 25 | 54 |
| **ELWOOD** | | |
| Outpost Tests at Elwood Show Unfavorably | Jan. 11 | 46 |
| Fifth Producer at Elwood Completed | Jan. 18 | 42 |
| Well a Month Schedule of Development at Elwood | Jan. 25 | 54 |
| Elwood Outpost Tests Appear Failures | Feb. 1 | 58 |
| Elwood Edge Wells Have Deeper Chance | Feb. 15 | 53 |
| Outpost Wells at Elwood Appear Badly Located | March 1 | 60 |
| Seventh Elwood Test Due for Early Completion | March 8 | 58 |
| Eighth Well at Elwood Flows 5500 Barrels | March 22 | 57 |
| Price Cut at Elwood Not Stopping Development | March 29 | 72 |
| Elwood—Such Fields Seldom Seen *By Brad Mills* | April 19 | 24 |
| Elwood to Become Major California Factor | Oct. 4 | 226 |
| Ocean Field at Elwood Presents Busy Scene | Oct. 18 | 59 |
| Trend of Production Defined at Elwood | Oct. 25 | 65 |
| Elwood Drilling Operations Present Unique Problem *By Brad Mills* | Dec. 20 | 22 |
| **NORTH DAKOTA** | | |
| North Dakota Producer to Be Pumped | Feb. 1 | 108 |
| **WILDCATS** | | |
| **MISCELLANEOUS** | | |
| Plan Development of New Field in Illinois | Jan. 25 | 102 |
| Arkansas Ozark Region Getting Thorough Exploration | May 24 | 56 |
| Mississippi Wildcat Test Attracts Oil Men | August 9 | 76 |
| Mississippi Test Throws Mud Over Derrick | Oct. 18 | 58 |
| Attempt to Test Gas Flow in Mississippi Wildcat | Nov. 1 | 63 |
| Wildcat Will be Drilled in Yalabousha County (Mississippi) | Nov. 29 | 112 |
| Fishing Jobs Take Time in Mississippi Wildcats | Dec. 13 | 362 |
| **TEXAS GULF COAST** | | |
| Sugarland Extended | Jan. 11 | 42 |
| New Producing Sand at Raccoon Bend | Jan. 18 | 48 |
| Vacuum Has Oil Show in Jefferson Davis Parish | Jan. 18 | 48 |
| Texas Company Starts Tests on Three Domes | Jan. 18 | 48 |
| Sugarland Well Makes 1600 Barrels | Jan. 18 | 48 |
| Biggest Fannett Well Runs Wild Following Fire | Jan. 25 | 40 |
| Vacuum Oil Company Opens New South Louisiana Field | Jan. 25 | 42 |
| Texas Company Locates Test in Terrebonne | Jan. 25 | 42 |
| Two Texas Coast Domes Get Tests | Feb. 1 | 61 |
| Busy Year of Drilling Ahead in South Louisiana | Feb. 1 | 61 |
| Sulphur Deposit is Found in Lake Peigneur Test | Feb. 1 | 61 |
| Wildcatters Will Seek Oil in Louisiana Maritime Zone | Feb. 1 | 81 |
| Drilling to Check Domes Geophysically | Feb. 8 | 66 |
| Coastal Depth Record Set at Goose Creek | Feb. 8 | 66 |
| The Texas Company Starts Terrebonne Tests | Feb. 8 | 66 |
| Gulf Starting Two Tests at Fannette | Feb. 15 | 58 |
| Gonzales County Tests at Critical Stage | March 22 | 65 |
| Start Test Southeast of New Orleans | Feb. 15 | 58 |
| Goose Creek Wildcat Test Reported Spraying | May 17 | 70 |
| Texas Company Drilling Four Wildcat Tests | July 5 | 68 |
| **NORTH CENTRAL TEXAS** | | |
| East Texas Wildcat Campaign Getting Under Way *By H. H. King* | Dec. 27 | 34 |
| **WEST TEXAS** | | |
| West Texas Wildcat Effort Nets New Producing Wells *By H. H. King* | Feb. 22 | 56 |
| Second Producer in Pecos County Wildcat Area | Feb. 22 | 86 |
| Coleman Wildcat Well Has Oil and Gas Flowing | Feb. 22 | 216 |
| Gulf Applies Back Pressure to Ward County Wildcat | April 26 | 57 |
| New Wildcats Produce Oil in West Texas | April 19 | 54 |
| Ward County Wildcat Area Well Proved by Week's Developments | June 14 | 41 |
| Three New Prospective Spots Opened in West Texas | Oct. 11 | 200 |
| **KANSAS** | | |
| Week's Developments Change Allen Field Prospects *By Warren Baker* | Jan. 25 | 41 |
| Freezing Weather Slows Work in Kansas | Jan. 25 | 44 |
| Marion County Well Increases When Deepened | Feb. 1 | 52 |
| Wildcat Developments Feature Week in Kansas | April 19 | 51 |
| Three New Pools and an Extension Encourage Kansas Wildcatters | April 26 | 55 |
| Western Kansas Wildcat Making Gas, Will Increase Exploration | May 10 | 58 |
| Extended Search for Production in Kansas Still Growing *By Warren Baker* | May 17 | 32 |
| Co-operation and Use of Core Drill Make Kansas Tests Unique *By Campbell Osborn* | July 12 | 36 |
| Wildcat Work Over Wide Kansas Area Promises Busy Period *By Warren Baker* | July 26 | 68 |
| Kansas Wildcat Activity Remarkably Successful During 1929 *By Warren Baker* | July 26 | 69 |
| Western Kansas Wildcat Produces High Gravity Oil | Sept. 27 | 50 |
| Widely Separated Wildcats Hold Interest in Kansas | Nov. 8 | 53 |
| **OKLAHOMA** | | |
| Texas 50-50 With Phillips at Oklahoma City | Jan. 18 | 44 |
| Advanced Geology Encourages West Oklahoma Drilling *By Warren Baker* | Jan. 25 | 39 |
| Franklin Deepening Test in Caddo County | March 15 | 54 |
| Oklahoma's Deepest Test in Coal County | March 29 | 56 |
| Allen Field Tests Near Completion | April 5 | 72 |
| Oklahoma's Deepest Test Reveals Information on Geology *By Warren Baker* | April 12 | 91 |
| Wildcat Strike Between Maud and St. Louis | Oct. 25 | 50 |
| Oklahoma Wildcat Tests Have New Objective in Arbuckle *By Warren Baker* | Nov. 29 | 49 |
| **NORTH LOUISIANA-ARKANSAS** | | |
| Wildcat Between Louann and Stephens Productive | Feb. 22 | 96 |
| Start Tests in Ozarks of Arkansas | March 1 | 56 |
| New Drilling in North Louisiana-Arkansas Area Increases | March 8 | 94 |
| Deeper Drilling at Champagnolle Shows Possibilities | Jan. 18 | 45 |
| Test Shows Possible Extension of Champagnolle South | Jan. 25 | 56 |
| New Area Opened for Production in Champagnolle Field | March 15 | 72 |
| **CALIFORNIA** | | |
| Make Try for Extension at Ventura | Jan. 18 | 52 |
| Hawthorne Area May Have Townlot Drilling | Jan. 18 | 76 |
| Report of Shallow Strike at Potrero Premature | Jan. 25 | 54 |
| Seal Beach Test Takes in 450 Feet Sand | Jan. 25 | 58 |
| Favorable Show in Deep Test at Rincon | Feb. 1 | 95 |
| Deep Sand at Seal Beach Shows Favorable Prospect | Feb. 1 | 58 |
| Lawndale Area Has Many Wells Drilling | Feb. 1 | 58 |
| Plan Deep Drilling in Los Angeles Basin Area | Feb. 8 | 78 |
| Wildcatting Increasing in Santa Barbara | April 12 | 88 |
| Elwood Field Wildcat to Drill Deeper | April 12 | 101 |
| Orlando District Wildcat May Open New Production | May 17 | 65 |
| No Critical Developments in Los Angeles Wildcats | No. 15 | 70 |
| California Wildcat Effort Continues | Dec. 20 | 66 |
| **MOUNTAIN STATES** | | |
| Kevin-Sunburst Producer Making 1000 Barrels | Jan. 11 | 66 |
| Colorado Wildcat Test Has Oil at Shallow Depth | Jan. 18 | 58 |
| Deep Kevin-Sunburst Well Making Gas | Jan. 18 | 58 |
| White Eagle Gets Lease on Teapot Dome Equipment | Jan. 18 | 58 |

| | Date 1929 | Page |
|---|---|---|
| Start Pilot Butte Test | Feb. 15 | 66 |
| Tests Announced Near Colorado Discovery | Feb. 15 | 66 |
| Four Bear Structure (Wyoming) | Feb. 15 | 78 |
| Moving in Material for Colorado Offset Tests | Feb. 22 | 202 |
| Start Wells in Vineland District, Colorado | March 8 | 98 |
| Wildcat Makes Strike Near Montana Border | Oct. 11 | 205 |
| Montana Wildcat Strikes Results in Two New Pools | Oct. 18 | 54 |
| **NEW MEXICO** | | |
| Increased Activity Seen for New Mexico During Summer | May 3 | 84 |
| Another Prospective Producing Area in New Mexico | May 24 | 58 |
| New Mexico Drilling Will Show "Low Down" This Year — *By H. H. King* | June 7 | 23 |
| New High Gravity Area Opened in New Mexico | July 5 | 51 |
| New Mexico Area Renews Promise of Important Production | July 12 | 51 |
| New Mexico Wildcat Develops Gas Flow Under Oil Show | July 19 | 36 |
| Expect Four Completions in Eddy County Soon | August 16 | 72 |
| New Mexico Wildcat Cores Oil Saturated Lime | Dec. 6 | 57 |
| **CANADA** | | |
| Canadian Wildcat Makes Heavy Oil | May 31 | 58 |
| **LAND AND LEASING** | | |
| Suit Will Stop Auction of Texas University Land | Jan. 4 | 30 |
| The California Company Buying Leases | Jan. 4 | 42 |
| Contest Stimulates Lease Efficiency for The Texas Company — *By Jack Logan* | Jan. 25 | 104 |
| Permits Show Increase for First Quarter — *By Wallace Davis* | May 3 | 66 |
| Sheeders Osage Lease Object Lesson in Efficiency — *By Wallace Davis* | May 31 | 32 |
| Cancellation of Government Permits Reaches Big Total | June 7 | 61 |
| Low Figures at Osage Lease Sale Contrast Old Days | Sept. 27 | 30 |
| New Lease Form Would Minimize Division of Royalties — *By Wm. V. Gross* | Nov. 22 | 28 |
| Rocky Mountain Producers Want Federal Lease Revision — *By A. J. Haslett* | Nov. 29 | 44 |
| New Mexico Oil Men Oppose 1929 State Lease Law — *By Ladd Haystead* | Dec. 20 | 36 |
| Fee Owners Rights Set Forth by Lawyer | Dec. 27 | 78 |
| **DISTRIBUTION** | | |
| Kansas City Pipe Line Completed | Jan. 11 | 50 |
| Montana Line to Serve 26 Communities | Jan. 11 | 50 |
| Stringing Pipe for Gas Line to El Paso | Jan. 18 | 44 |
| Work to Start on Gas Line to St. Louis | Feb. 1 | 60 |
| Gas Line Net-Work in West Texas Extended | Feb. 8 | 50 |
| Work Progressing on Gas Line to Salt Lake | Feb. 15 | 48 |
| Start Work on Gas Line to San Francisco | Feb. 15 | 48 |
| Gas Line to St. Louis Causes Spurt in Louisiana Fields | Feb. 15 | 54 |
| Bowes Field to Supply Gas for Minneapolis | March 1 | 64 |
| New Gas Line to Serve Humble Plant at Ingleside | March 22 | 66 |
| Distribution of Gas in California to Increase | March 22 | 66 |
| Houston Pipe Line Builds More Texas Line | March 29 | 63 |
| 250-Mile Line Planned in California | April 5 | 68 |
| Gas Line to Baton Rouge Increased Two Loops | April 12 | 119 |
| Lone Star Gas Extension to Serve Four Towns | April 19 | 64 |
| United Gas Service Company to Serve Oklahoma Cities | April 26 | 64 |
| Expect Small Lines to Tie Into Main Gas Lines | April 26 | 64 |
| Magnolia Gas Company Building Lines to Southwest Texas | May 3 | 110 |
| 20-Inch Gas Line from Monroe to Washborn | May 17 | 44 |
| Magnolia Starts Gas Line to San Antonio | May 31 | 66 |
| Central Texas Towns to Get Gas Supply | June 14 | 104 |
| Texas Gas Will Be Piped to Monterrey, Mexico | June 21 | 65 |
| Texas Panhandle-Chicago Gas Line Proposed | July 19 | 52 |
| Extensive Gas Distributing Systems Built | July 26 | 178 |
| Long Line Delivering Wyoming Gas to Salt Lake City — *By R. L. Haslett* | Aug. 30 | 25 |
| Start Gas Delivery to San Francisco | Sept. 6 | 63 |
| East Texas Towns to Get Natural Gas Supply | Sept. 6 | 98 |
| Permit is Granted for 163-Mile Gas Line | Sept. 13 | 57 |
| Complete First Unit of Panhandle Gas Line | Sept. 20 | 70 |
| New Mexico Line Starts Gas Delivery | Sept. 20 | 78 |
| More West Texas Towns Get Gas Service | Oct. 4 | 229 |
| Eight Towns Receive Gas from Company in Month | Nov. 1 | 63 |
| Petrolia-Dallas Natural Gas Line Progressing | Dec. 13 | 277 |
| **DRILLING AND EXPLORATION** | | |
| Louisiana Output Gains 50 Billion Cubic Feet | March 1 | 64 |
| Gas Over-Plus Increased at Santa Fe Springs | March 1 | 64 |
| Summary of Oil and Gas Development in Western Canada for 1928 | March 1 | 101 |
| Southwestern Kansas Due for Active Campaign | March 29 | 76 |
| Deep Gas Well Drilled on Garland Dome | April 5 | 68 |
| Two Important Gas Developments in Northern Louisiana | April 19 | 66 |
| Blow-out in Goleta May Prove New Gas Field | Aug. 10 | 70 |
| Humble Gets Gas Strike on Dome Near Houston City Limits | Aug. 23 | 58 |
| New West Virginia Gas Pool Important | Sept. 27 | 62 |
| Nueces County Gets Large Gas Well | Oct. 4 | 215 |
| New Gas Field Opened in Eastern Oklahoma | Oct. 18 | 51 |
| Moody-Seagraves Option Gas Properties of Magnolia | Oct. 25 | 66 |
| Sale of Large Gas Holdings to Moody-Seagraves, Plan | Nov. 1 | 32 |
| **MISCELLANEOUS DEVELOPMENTS** | | |
| Serious Gas Wastage in California | Jan. 11 | 50 |
| Expect Large Attendance at Southwest Gas Meeting | Jan. 11 | 50 |
| Technical Discussions Feature Gas Meeting at Shreveport — *By H. J. Struth* | Jan. 18 | 30 |
| Gas Meter Short Course Announced | Feb. 8 | 50 |
| Gas Dissolved by Crude Under Pressure | March 1 | 64 |
| Arkansas Gas Buys Little Rock Plant | March 29 | 63 |
| Utilization of Waste Natural Gas | April 19 | 64 |
| Union Oil Company's Method of Storing Gas — *By Brad Mills* | May 3 | 52 |
| Gas Plays Important Part in Cities Service | May 3 | 110 |
| Measuring Large Volumes of Gas — *By Thos. R. Weymouth* | May 10 | 35 |
| Doherty Organization Expanding in Louisiana and Arkansas | May 17 | 44 |
| Lone Star Gas Company Has Big Expansion Program for Summer | May 24 | 50 |
| North Louisiana Gas Companies in Big Combine | May 31 | 66 |
| Production and Utilization of Natural Gas in California — Second Installment — *By Claude Brown* | June 7 — June 14 | 25 — 31 |
| California Gas Projects Involve $14,000,000 Costs | June 14 | 104 |
| Natural Gas Development in the Southwest — *By Kent Ridley* | June 28 | 44 |
| United Gas Company has Rapid Growth in Southwest — *By Wm. V. Gross* | June 28 | 45 |
| Texas and Louisiana Fields Supply United Gas Company's Lines | June 28 | 57 |
| Chart Shows Company Relationship Through Stock Control | June 28 | 64 |
| Building Line Across Bay Required Special Tools and Methods | June 28 | 67 |
| Four Main Compressor Stations Handle Gas Through Long Lines | June 28 | 69 |
| Formations in Coast Country Require Special Pressure Control | June 28 | 80 |
| United Gas Becomes International Unit | June 28 | 86 |
| Increase in Use of Natural Gas Rapid in South and West | July 26 | 65 |
| Simple Method of Measuring the Output of Gas Wells | Aug. 9 | 56 |
| Major Gas Projects are Planned in Western Area | Aug. 16 | 68 |
| Wyoming-Utah Line First 18-Inch Arc Welded Gas Pipe | Aug. 30 | 26 |
| Natural Gas Industry Now Growing in California | Oct. 11 | 209 |
| Natural Gas Consumption Shows Further Gain in 1928 | Nov. 1 | 56 |
| Rapid Expansion of Use of Gas in California | Nov. 8 | 70 |
| **FOREIGN DEVELOPMENTS—GENERAL** | | |
| Egyptian Petroleum Consumption Increasing | Jan. 4 | 66 |
| Further Decline Shown in Tampico Production | Jan. 25 | 76 |
| New Record for Russian Oil Shipments | Jan. 25 | 76 |
| Internal Affairs Cramping Balkan Operations — *By H. E. Cassidy* | Feb. 1 | 23 |
| Report Proposes Oil Policy Changes in Trinidad — *By Roy E. Leigh* | Feb. 8 | 19 |
| Japan Still a Potential Buyer of Foreign Oil — *By King Hamilton Grayson* | Feb. 15 | 28 |
| Modern Equipment Paves Way for Deeper Drilling in Roumanian Fields — *By H. E. Cassidy* | Feb. 22 | 47 |
| Mexico Continues Downward Trend Production and Drilling — *By George Blardone* | Feb. 29 | 99 |
| Trinidad Drilling Progresses in Orderly Manner — *By Roy E. Leigh* | March 8 | 19 |
| Agreement Opens Dutch Oil Lands to Americans | March 8 | 98 |
| Trinidad Drillers Develop Method of Handling High Pressures — *By Roy E. Leigh* | March 15 | 23 |
| The Latest from Baku — *By King Hamilton Grayson* | March 22 | 34 |
| Applying the Air Gas Lift to Roumania's Production Problems — *By H. E. Cassidy* | March 29 | 21 |
| Government Seeking Oil in Australia | April 12 | 56 |
| Crooked Hole Problem Minimized in Burma — *By Wallace Davis* | May 17 | 31 |
| Money Saving System in Burma Oil Company's Wire Line Department — *By Wallace Davis* | May 24 | 28 |
| Small Pumping Wells Handled Profitably in Burma — *By Wallace Davis* | May 31 | 23 |
| Roumanian Camp Life and Living Conditions of the Laboring Classes — *By H. E. Cassidy* | June 14 | 24 |
| Burma Oil Company's Present Method of Drilling Wells in Yenangyoung Field | June 14 | 35 |
| Australia Searches for Oil — *By E. A. Dunncliff* | June 21 | 24 |
| Burma's Oil Development Brought Civilization to the Jungle — *By Henric De Leeuw* | July 19 | 26 |
| Burma Oil Operatives Live in Jungle but have Advantages of Civilization | July 19 | 80 |
| Mexican Oil Production Shows Further Decline | Oct. 11 | 190 |
| Crude Petroleum in Alberta — *By Dr. Theo. A. Link* | Oct. 11 | 205 |
| Greater Growth Planned for Industry in Russia | Oct. 18 | 38 |
| Geological Structure of Roumanian Oil Field — *By H. E. Cassidy* | Oct. 25 | 30 |
| Roumanian Hand-Dug Wells Reach Depths Around 650 Feet — *By H. E. Cassidy* | Nov. 15 | 26 |
| Japanese Not Worried by Over-Production — *By Roy E. Leigh* | Nov. 22 | 25 |
| **SOUTH AMERICA** | | |
| Battle-Front Shifts at Maracaibo — *By Roy E. Leigh* | March 22 | 23 |
| Situation Forces Curtailment Pact in Venezuela — *By Roy E. Leigh* | April 5 | 24 |
| McDermond Leads Maracaibo "Foreign Colony" Through Annual Blowout — *By Roy E. Leigh* | April 12 | 120 |
| You Talk in Big Figures When you Talk in Venezuela — *By Roy E. Leigh* | April 19 | 26 |
| Four-Way Agreement Effectively Curtailing Venezuela — *By Roy E. Leigh* | April 26 | 21 |
| Ten Potential Oil Fields on Venezuelan Horizon — *By Roy E. Leigh* | May 3 | 55 |
| Chester Crebbs Wins Maracaibo Annual Boat Races | May 3 | 88 |

| | Date 1929 | Page |
|---|---|---|
| International Conference on New Colombian Oil Law *By Roy E. Leigh* | May 24 | 21 |
| Colombia Less Hostile Toward Outside Interests *By Roy E. Leigh* | June 7 | 36 |
| Experiences Above the Andes *By Roy E. Leigh* | June 28 | 39 |
| Airplane Service Makes Hours of Days Travel in South America *By Roy E. Leigh* | July 2 | 28 |
| Ecuadorian Operators Cling to the Primitive *By Roy E. Leigh* | Sept. 6 | 42-3 |
| Political Log Rolling Delays Action on New Colombian Petroleum Law *By Roy E. Leigh* | Sept. 20 | 38 |
| Time for Deep Drilling Has Not Arrived in South America *By Roy E. Leigh* | Oct. 4 | 71 |
| Nationalization Hits Snag in Argentina *By Roy E. Leigh* | Oct. 11 | 42 |
| El Mene and Dabajaio Controlled by Americans is Report *By Roy E. Leigh* | Oct. 18 | 23 |
| Line Outlet from New Field to Maracaibo Lake *By Roy E. Leigh* | Oct. 25 | 25 |
| Maracaibo Restriction Agreement May be Extended During 1930 *By Roy E. Leigh* | Dec. 27 | 23 |
| Quirequire and Chichiriviche Report Substantial Progress *By Roy E. Leigh* | Dec. 27 | 25 |
| Tropical Opens New Field in Colombia, South America | Dec. 27 | 25 |

**SOUTH AMERICAN ISSUE**
**Roy E. Leigh**

| | | |
|---|---|---|
| This Issue (Editorial) | Dec. 13 | 67 |
| No Tariff Needed Against South America | Dec. 13 | 69 |
| South America will Set New Production Record in 1929 | Dec. 13 | 70 |
| Foreign Producers in Argentina Facing Uncertain Government Policy | Dec. 13 | 72 |
| Comodoro Rivadavia District (Map) | Dec. 13 | 74 |
| Outline Map of Argentina | Dec. 13 | 75 |
| Government Largest Individual Producer in Argentina | Dec. 13 | 76 |
| Venezuela Has Ten Potential Oil Fields | Dec. 13 | 77 |
| Map of Venezuela | Dec. 13 | 78 |
| Maracaibo Lake-Shore District May Develop Into One of World's Greatest Oil Fields | Dec. 13 | 79 |
| Map of Maracaibo Basin | Dec. 13 | 80 |
| Drilling Records Established in Maracaibo Lake Drilling | Dec. 13 | 82 |
| Rio Tara District to Start Crude Shipments Soon | Dec. 13 | 90 |
| Map of Colombia and Venezuela | Dec. 13 | 90 |
| Map of Las Cruces Field | Dec. 13 | 92 |
| Map of El Cubo and Los Manueles Fields | Dec. 13 | 94 |
| Colombian People Consider Barco Concession Big National Asset | Dec. 13 | 97 |
| Andian Sets New Standard by which to Measure Pipe Line Construction | Dec. 13 | 103 |
| With the Andean National Personnel | Dec. 13 | 107 |
| Maracaibo "Bottle Neck" Limits Movements of Tankers | Dec. 13 | 115 |
| Colombian Wildcat Operations Tantalizingly Unsuccessful | Dec. 13 | 131 |
| Oil Map of Colombia | Dec. 13 | 131 |
| Standard Oil Company Prospecting in Southern Bolivia and Northern Argentina | Dec. 13 | 138 |
| Key Map of Bolivia | Dec. 13 | 143 |
| Ecuadorian Production Controlled by British | Dec. 13 | 147 |
| Drilling Machines and Hand Digging Serve in Cantivo District | Dec. 13 | 150 |
| Primitive Production Methods in Ecuador | Dec. 13 | 152 |
| Negritos Field Notable Example of Unit Operation | Dec. 13 | 154 |
| Map of District Served by the Southern Railways | Dec. 13 | 162 |
| Peruvian Fields Have Many Oil Sands | Dec. 13 | 164 |
| Peruvians Pioneered American Refining | Dec. 13 | 170 |
| Peru's Oldest Field is Its Smallest | Dec. 13 | 172 |
| Geologists Turn Their Attention to Eastern Slope of Andes | Dec. 13 | 174 |
| West Indies Not Promising Area for Oil Production | Dec. 13 | 176 |
| Asphalt Deposits of Trinidad and Venezuela | Dec. 13 | 178 |
| Lawyers and Law-makers Skim the Cream of Trinidad's Oil Industry | Dec. 13 | 186 |
| Proposed British-American Dictionery of Oil Field Terms | Dec. 13 | 192 |
| Bureau of Mines Analyses of Typical South American Crudes | Dec. 13 | 196 |
| Colombian Petroleum Legislation to be Revised | Dec. 13 | 212 |
| Venezuelan Producers Compete with American Operators | Dec. 13 | 244 |
| Trinidad Policy Restricts Oil Development to British | Dec. 13 | 250 |
| Retrenchment Rules at Lobitos | Dec. 13 | 254 |
| Infantas and La Cira Wells have Remarkable Longevity | Dec. 13 | 256 |


# Market Review and Forcasts


**GENERAL**

| | | |
|---|---|---|
| Year Closes With Production at Peak *By H. J. Struth* | Jan. 4 | 25 |
| U. S. Proportion of World Output Declines During 1928 | Jan. 4 | 27 |
| Production Up Another 10,000 Barrels Daily *By H. J. Struth* | Jan. 11 | 25 |
| United States Daily Average Production | Jan. 11 | 52 |
| First Production Decline of Year is Hopeful Sign | Feb. 22 | 71 |
| Domestic Production Continues Downward Trend | March 22 | 43 |
| Production Takes Up-Turn in Face of Proration Talk | March 29 | 43 |
| California and Oklahoma Send Daily Average Up | April 26 | 41 |
| California Orders Bringing Output Down *By Brad Mills* | May 3 | 67 |
| Higher Prices Bring Increased Production | May 31 | 39 |
| Thirty Million Barrel Crude Stock Increase This Year *By H. J. Struth* | July 26 | 55 |
| Production Down 135,000 Barrels from Peak | Oct. 18 | 41 |
| Production Up—Market Structure Weakening | Oct. 25 | 39 |
| Production Being Held in Check; Further Improvement Anticipated | Dec. 6 | 42 |
| All Flush Areas Stage Production Decline | Dec. 20 | 40 |


# Markets—Production—Crude Prices


**GENERAL PRODUCTION STATISTICS BY FIELDS —**

| | | |
|---|---|---|
| Seminole Production | Jan. 11 | 42 |
| California and Pennsylvania Await Mid-Continent Leadership | Feb. 8 | 45 |
| California Production Rises in Direct Relation to Greater Depths Penetrated *By Brad Mills* | Feb. 22 | 51 |
| Production Figures Reveal Earnest Curtailment Efforts | April 5 | 47 |
| Production Decline Indicative of Curtailment Plan Possibilities | April 19 | 37 |
| Gulf Coast Production Up 3950 Barrels | April 19 | 55 |
| Salt Flat Production Passes Million Barrels per Month | April 19 | 56 |
| Long Beach Production Up; Complete Deep Wells | April 19 | 62 |
| Yates Field Production Increased May 10 | May 7 | 68 |
| Another Gain of 20,000 Barrels in California | June 28 | 89 |
| Crude Production Reaching Critical Stage | July 5 | 49 |
| California Production Nearing Peak; A Hopeful Sign | July 19 | 33 |
| California Production Decline Aids Crude Situation | July 26 | 131 |
| Substantial Decline Recorded in California Production | Aug. 2 | 41 |
| Production Rise and Consumption Decline Endanger Crude Price | Aug. 9 | 39 |
| California and Texas Panhandle Boost Production | Aug. 23 | 39 |
| Immediate Curtailment in California Anticipates 100,000 Barrel Decline *By H. J. Struth* | Sept. 6 | 37 |
| Texas and Oklahoma Continue Gains; California Declining | Sept. 6 | 71 |
| California Deep Drilling Boosts Production; Market Weakening | Sept. 20 | 56 |
| Further Decline in California Offset by Oklahoma Gain | Nov. 22 | 41 |

**MONTHLY PRODUCTION STATISTICS**

| | | |
|---|---|---|
| Production Substantially Higher in December *By H. J. Struth* | Jan. 18 | 27 |
| February Crude Production Tops January Despite Handicap *By Wm. V. Gross* | March 22 | 36 |
| Production Rise Halted in March *By H. J. Struth* | April 19 | 67 |
| All Oil Stocks Increased in March | May 3 | 82 |
| Fewer Wells Completed; Lower Production in April *By H. J. Struth* | May 24 | 67 |
| June Production Up 124,000 Barrels a Day *By H. J. Struth* | July 19 | 80 |
| July Production Sets New High Level for United States *By Jack Logan* | Aug. 23 | 30 |
| Less Development Lowers Output in September *By H. J. Struth* | Oct. 25 | 33 |
| November Production Reflects Curtailment Efforts *By H. J. Struth* | Dec. 13 | 65 |

**STOCK STATISTICS**

| | | |
|---|---|---|
| California Stocks Up 40 Million Barrels | Oct. 25 | 65 |
| Stocks of All Oils Increased During August | Nov. 1 | 51 |
| California Stocks Show Decrease in November | Dec. 27 | 61 |
| Crude Stocks Declining While Refined Products Increase | Dec. 27 | 62 |

**MARKETS AND STATISTICAL**

| | | |
|---|---|---|
| Record Demand Not to Absorb Current Crude Output | Feb. 22 | 45 |
| Wyoming Royalties Show Market Condition | March 1 | 56 |
| Greater Movement Strengthens Market in West Texas *By H. H. King* | April 19 | 35 |
| Refinery Demand Creating Sellers' Market | May 3 | 69 |
| Demand for Crude Revives Price Boost Talk | May 17 | 47 |
| Oklahoma Furnishes Incentive for Higher Crude Market | May 24 | 39 |
| Increase Restores Gravity Scale in West Texas District | May 24 | 57 |
| Barometrics Reflect Crude Market Improvement *By H. J. Struth* | May 31 | 21 |
| Large Refinery Crude Demand Indicated *By H. J. Struth* | June 14 | 23 |
| Further Crude Price Advances Unwarranted | June 14 | 39 |
| Refinery Crude Demand Exceeding Estimates *By H. J. Struth* | July 12 | 23 |
| Mid-Continent Situation Not So Bad; California Chief Overproducer | July 12 | 39 |
| Drilling Activities to Be Less Pronounced | July 26 | 60 |
| Gasoline Market Firm With Strong Demand; New Peak Production | Aug. 30 | 39 |
| Mid-Continent Boosts August Production to New Peak *By H. J. Struth* | Sept. 20 | 46 |
| Santa Fe Springs Development Courts Lower Crude Market *By H. J. Struth* | Sept. 27 | 26 |
| Mid-Continent Crude Situation Further Improved | Oct. 11 | 183 |

| | Date 1929 | Page |
|---|---|---|
| Crude Receipts on East Coast Suggest Refinery Expansion *By H. J. Struth* | Oct. 18 | 21 |
| Production Outlook Decidedly Encouraging | Nov. 8 | 39 |
| Price Structure Strengthened by Proration in California *By H. J. Struth* | Nov. 15 | 36 |
| No Let-up in Drilling During October *By H. J. Struth* | Nov. 22 | 76 |
| California Refinery Crude Demand Inflated *By H. J. Struth* | Dec. 20 | 21 |
| California Drilling Endangers Market Structure | Dec. 27 | 36 |
| **QUARTERLY FIELD AND PRODUCTION STATISTICS** | | |
| Texas Quarterly Production Report | March 1 | 69 |
| Oklahoma Quarterly Production Report for Fourth Quarter, 1928 | March 1 | 76 |
| Texas Reaches New High Output Quarterly Report Shows | June 7 | 66 |
| Oklahoma Shows Production Loss for First Quarter | June 7 | 66 |
| Oklahoma Production Report for Second Quarter | Aug. 23 | 72 |
| Texas Production Again Sets Record Second Quarter | Sept. 13 | 65 |
| Texas Quarterly Production Report Second Quarter, 1929 | Sept. 13 | 66 |
| Oklahoma Quarterly, Third Quarter | Nov. 29 | 115 |
| Texas Quarterly Production Report, Third Quarter, 1929 | Dec. 20 | 97 |
| **MAGNOLIA PIPE LINE RUNS** | | |
| Magnolia Runs Lower in November | Jan. 4 | 38 |
| Magnolia Pipe Line Runs Under January Average in February | March 22 | 68 |
| Magnolia Pipe Line Runs Drop Substantially in March | April 19 | 57 |
| Magnolia Draws on Storage to Keep Line to Coast Loaded | May 24 | 70 |
| Magnolia Pipe Line Runs Reflect Oklahoma Production Decline | June 21 | 36 |
| Magnolia Pipe Line Runs Lower in July | Aug. 16 | 56 |
| Magnolia Pipe Line Runs Decline Slightly in August | Oct. 4 | 242 |
| Magnolia Draws from Storage to Fill Requirements | Nov. 1 | 66 |
| Magnolia Crude Runs Show Substantial Decrease | Nov. 15 | 74 |
| **BUREAU OF MINES FIGURES** | | |
| Government Gives Data on Fuel Oil Consumption | Jan. 29 | 64 |
| Engineering Report on Seminole Oil Field | Jan. 4 | 100 |
| Stocks Increased in December, Government Report Shows | Feb. 8 | 40 |
| Study of Cotton Valley Made by Bureau of Mines | March 1 | 99 |
| Bureau of Mines Report Shows Better Balance in 1928 | March 15 | 106 |
| Bureau of Mines Reports Large Increase in Stocks | March 15 | 106 |
| Improvements Shown, Bureau of Mines Reports | May 10 | 41 |
| Survey Shows Crude Gravity Averages | May 24 | 62 |
| Bureau Studying Controlling and Gauging of Gas Wells | May 31 | 41 |
| Bureau of Mines Report Reflects Improvement | June 7 | 41 |
| Bureau of Mines Makes Study of Salvage | June 14 | 58 |
| Bureau of Mines Report Follows Study of Disposal of Oil Field Brines | Aug. 16 | 24 |
| July Production Sets New High Peak | Sept. 13 | 59 |
| Bureau Report Details Progress in Study of Recovery Problems *By Clarence L. Linz* | Nov. 22 | 27 |
| **PIPE LINE AND TRANSPORTATION** | | |
| **GENERAL** | | |
| New Type Pipe Line Weld Joint Takes Care of Expansion *By H. H. King* | April 19 | 23 |
| Arc Welded Line Stands Rigid Tests; Process Economical *By J. F. Lincoln* | April 26 | 27 |
| Design and Construction of Oil and Gas Pipe Lines *By E. C. Kincaide* | May 3 | 51 |
| Aerial Surveys Prove Big Aid in Pipe Line Location *By Wallace Davis* | July 5 | 33 |
| Pipe Line Expansion Work First Six Months 1929; California, Oklahoma, Kansas, Texas | July 26 | 62 |
| Hazards in Pipe Line Construction *By B. F. Fisher* | Oct. 4 | 128 |
| Problems and Progress in the Protection of Underground Pipe Lines Against Corrosion *By Dr. Gordon N. Scott* | Oct. 4 | 216 |
| World's Largest Submarine Oil Line is Completed | Nov. 1 | 35 |
| Rio Grande Terminal Augments Pacific Coast Shipping Facilities | Nov. 15 | 27 |
| Pure Oil Surveying for 10-Inch Trunk Line | Dec. 13 | 26 |
| **MISCELLANEOUS** | | |
| Prairie Will Increase Capacity to Chicago | Jan. 11 | 42 |
| Court Decision May Halt Transcontiental Line | Jan. 18 | 40 |
| Empire Buys Lines in Louisiana-Arkansas | March 29 | 63 |
| California Lines Fail to Keep Pace with Increased Production | July 26 | 62 |
| Arkansas Pipe Line Tax Assessments Fixed | Sept. 13 | 51 |
| **TEXAS** | | |
| **SOUTHWEST TEXAS** | | |
| Humble Increasing Line Capacity to Ingleside | Jan. 18 | 26 |
| Salt Flat Pipe Line Company Reorganized | Sept. 13 | 55 |
| Pipe Line Connection Provided Guadalupe County Producer | Nov. 1 | 58 |
| Darst Creek is Assured Ample Pipe Line Connection | Nov. 1 | 60 |
| **PANHANDLE** | | |
| Texas Crude Runs from Panhandle to Start | Jan. 11 | 34 |
| Van Area Production Will Get Line Outlet Immediately | Dec. 1 | 35 |
| **GULF COAST** | | |
| Complete Boggy Creek Pipe Line | Feb. 8 | 48 |
| Salt Flat Production to Move to Galveston | Feb. 8 | 63 |
| Two Pipe Lines Planned for Salt Lake Field | March 15 | 44 |
| Details of Gulf Loops to Coast Completed | May 3 | 83 |
| Contract Let for Oil Line Out of Refugio | May 31 | 60 |
| **WEST TEXAS** | | |
| Most of Pipe String for Texas-West Texas Line | Jan. 25 | 44 |
| Line Will Provide Outlet for Pecos County Oil | Feb. 1 | 59 |
| Yates Field Crude Moves to Shreveport | Feb. 8 | 48 |
| Gulf Extends West Texas Trunk Line 80 Miles to Hendrick | Feb. 8 | 62 |
| Magnolia Extending West Texas Line to Winkler County | Feb. 22 | 78 |
| Humble Buys Marland Lines to West Texas | Feb. 22 | 78 |
| Humble Increasing West Texas Line Capacity | March 1 | 52 |
| Transcontinental Trans-Texas Line Waiting Coast Order | March 8 | 34 |
| Two New Winkler Lines Ready April 1 | March 22 | 62 |
| Gulf Increasing West Texas Line Capacity to 50,000 Barrels | March 29 | 61 |
| Weather Makes Progress Slow on Texas-Empire Line | April 26 | 54 |
| Gulf Will Loop Unit of West Texas Trunk Line | April 26 | 58 |
| More Yates Crude Sought to Fill West Texas Lines | May 3 | 64 |
| Shipley Pool Gets Pipe Line Outlet; Crude is High Quality | May 17 | |
| Tidal Arranging Handling of West Texas Crude | May 3 | 71 |
| Texas Company Filling West Texas Line | May 17 | 69 |
| Humble Providing Pipe Line Outlet for Haskell County | May 24 | 57 |
| Hearing on More Runs for West Texas Lines | May 31 | 61 |
| Texaco Extending Line from Bulcher to Trunk | June 14 | 106 |
| New Pipe Line Company Located at Wickett | June 28 | 110 |
| Fifth West Texas Line Means Real Competition for Crude *By H. H. King* | July 5 | 46 |
| Yates Field Producers Have Plenty Line Outlets for Production | July 12 | 41 |
| Over 3,000 Miles of New Line Laid in Texas | July 26 | 63 |
| Gulf Runs Oil Through Loops on West Texas-Port Arthur Line | Sept. 6 | 67 |
| Texas-Empire Line to Mid-West Nears Completion | Sept. 27 | 39 |
| **OKLAHOMA** | | |
| Line to Oklahoma City Near Completion | April 5 | 60 |
| Oklahoma-Kansas Transportation Materially Increased *By Warren Baker* | July 26 | 64 |
| Prairie Increases Capacity Oklahoma City Line | Sept. 27 | 39 |
| Magnolia Line to Enter Oklahoma City Field | Oct. 25 | 41 |
| **MOUNTAIN STATES** | | |
| Texas Extending Pipe Line to New Mexico | Feb. 8 | 63 |
| Another Line to Serve Pondera Field | Jan. 4 | 62 |
| New Companies Formed on Wyoming-Utah Line | March 1 | 64 |
| Humble Extending Pipe Line Into New Mexico | March 22 | 62 |
| Two Lines Give New Mexico Outlet for Oil Production | May 10 | 40 |
| Texas Extending Line in New Mexico | June 7 | 52 |
| Texas Company Planning Pipe Line Extension | July 19 | 53 |
| **MAPS** | | |
| **GENERAL** | | |
| Natural Gas Pipe Line Map | Sept. 27 | 98 |
| New Geologic Map of New Mexico | Feb. 15 | 66 |
| **LOUISIANA** | | |
| Louisiana Gulf Marine Zone | Feb. 1 | 82-3 |
| Louisiana Gulf Coast Map | July 26 | 81 |
| Map of Zwolle Region | Dec. 13 | 289 |
| **CALIFORNIA** | | |
| Oil Map of Southern California | July 26 | 170-71 |
| Map of Potrero District | Oct. 18 | 69 |
| Map of Elwood Field | Dec. 20 | 24 |
| New Base Map of California | Dec. 6 | 106 |
| **KANSAS** | | |
| Map Sedgwick County, Kansas | Jan. 29 | 30 |
| Valley Center Area, Sedgwick County, Kansas | Feb. 1 | 37 |
| Central Kansas | April 5 | 58 |
| **TEXAS** | | |
| Map of Gonzales, County, Texas | Jan. 11 | 32 |
| Map of O'Brien Pool, Winkler County | Jan. 25 | 36 |
| Daugherty and Llano Pools | Feb. 15 | 55 |
| Clay Creek Field | March 1 | 54 |
| Bryson Field, Jack County, Texas | May 24 | 25 |
| Orange County, Texas | May 17 | 73 |
| Map of Barbers Hill | June 28 | 36 |
| Eastland County, Texas | June 28 | 110 |
| Map West Texas and New Mexico | July 26 | 72 |
| Yates Pool Map | July 26 | 73 |
| Gulf-O'Brien Pool Map | July 26 | 74 |
| Texas Gulf Coast Map | July 26 | 80 |
| Big Lake Field Map | July 26 | 84 |
| Map of Darst Creek District | Aug. 2 | 53 |
| Schafer Ranch Lease, Carson and Gray Counties, Texas | Aug. 2 | 63 |
| Esperson Dome, Liberty County, Texas | Aug. 23 | 59 |
| Section of Pecos County | Oct. 4 | 212 |
| Map of Leases and Ownership Blue Ridge Salt Dome | Oct. 11 | 37 |
| Van Zandt County, Texas | Oct. 18 | 55 |
| Map of Guadalupe County, Texas, Darst and Manford Pools | Oct. 25 | 56 |
| Map Coleman County, Texas | Dec. 13 | 280 |
| Darst Creek Maps | Dec. 27 | 28-9 |
| **OKLAHOMA** | | |
| Pearson-St. Louis District | April 12 | 74 |
| Map Oklahoma City Pool | Aug. 23 | 23 |
| **SOUTH AMERICA** | | |
| Map of North and South America | Feb. 8 | 27 |
| Map of Venezuela | Mar. 8 | 20 |
| Map of Colon District, Venezuela | Oct. 25 | 25 |
| Comodoro-Rivadavia District | Dec. 13 | 74 |
| Outline Map of Argentina | Dec. 13 | 75 |
| Map of Venezuela | Dec. 13 | 78 |
| Map Maracabio Basin | Dec. 13 | 80 |
| Map Colombia and Venezuela | Dec. 13 | 90 |
| Map Las Cruces Field | Dec. 13 | 92 |
| Map El Cubo and Los Manuels Fields | Dec. 13 | 94 |
| Oil Map of Colombia | Dec. 13 | 133 |
| Key Map Bolivia | Dec. 13 | 143 |
| Map of District Served by Southern Railway of Peru | Dec. 13 | 162 |
| Map of Maracabio Basin | Dec. 27 | 26 |
| Map of the Playa Del Rey District | Dec. 27 | 30 |

*Special Supplement to January 30, 1931 Issue of The OIL WEEKLY*

# 1930 Index to The Oil Weekly

***Specializing to the Producing and Pipe Line Branches of the Oil and Gas Industry***

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## SUBJECTS COVERED IN INDEX


| | Page |
|---|---|
| **Association Activities, Conventions, Expositions** | 2 |
| **Conservation—Cooperation** | 3 |
| **Curtailment—Proration** | 3 |
| California | 3 |
| Kansas | 4 |
| Kentucky | 4 |
| New Mexico | 4 |
| Oklahoma | 4 |
| Texas | 4 |
| **Engineering, Technical, Research** | 5 |
| Engineering, Exploration | 5 |
| Engineering, Economic | 5 |
| Engineering, Drilling and Production | 5 |
| Engineering, Pipe Line and Transportation | 7 |
| **Economics, Crude Markets, Statistics** | 7 |
| Economic Situation | 7 |
| Market Reviews, Forecasts | 8 |
| Crude Oil Price Changes | 8 |
| Production and Field Statistics | 9 |
| Stocks and Storage | 9 |
| **Features, Editorials, News** | 9 |
| Editorials | 9 |
| Special Features | 9 |
| General News | 9 |
| Financial | 10 |
| Law and Legislation | 10 |
| Personnel and Safety | 10 |
| **Field Development and Exploration** | 10 |
| Foreign | 10 |
| Domestic | 12 |
| Arkansas | 12 |
| California | 12 |
| Colorado | 13 |
| Kansas | 13 |
| Kentucky | 13 |
| Louisiana | 13 |
| Michigan | 14 |
| Mississippi | 14 |
| Montana | 14 |
| Nebraska | 14 |
| New Mexico | 14 |
| Oklahoma | 14 |
| South Dakota | 15 |
| Texas | 15 |
| Washington | 18 |
| Wyoming | 18 |
| **Maps** | 18 |
| Foreign | 18 |
| Domestic | 18 |
| **Pipe Lines and Transportation (Construction News)** | 18 |
| General | 18 |
| Foreign | 18 |
| Domestic | 18 |

# 1930 THE OIL WEEKLY INDEX 1930

## Associations, Activities, Convention, Expositions


### American Association of Petroleum Geologists

| | Date | Page |
|---|---|---|
| A.A.P.G. to Meet in New Orleans in March | Jan. 3 | 70 |
| Sidney Powers New President of Geologists Association. *By Kent Ridley* | March 28 | 44 |
| Pacific Section, A.A.P.G. Has Record Attendance At Meeting | Nov. 14 | 85 |

### American Gas Association

| | | |
|---|---|---|
| Arrange for Large Attendance at Gas Meeting at New Orleans | Apr. 4 | 66 |
| Gas Men Talk Wider Markets at New Orleans. *By H. J. Struth* | May 9 | 39 |

### American Institute of Mining and Metallurgical Engineers

| | | |
|---|---|---|
| Engineers See Controlled Operation as Road to Stabilization | Feb. 28 | 33 |
| A.I.M.M.E. Meeting in Los Angeles Has Good Program. | Oct. 3 | 168 |
| A.I.M.M.E. Meeting Draws Large, Interested Attendance | Oct. 10 | 66 |
| A.I.M.M.E. Fall Meeting Attracts Large Attendance | Oct. 24 | 79 |

### American Petroleum Institute

| | | |
|---|---|---|
| Production Division Meets at Pittsburgh in April | Feb. 7 | 64 |
| Tonkawa Field Men Hear Talk on Gasoline Field Operations | Feb. 28 | 68 |
| Drumright A.P.I. Chapter Discusses Treating of Oil | Mar. 28 | 38 |
| Division of Production in Session at Midland | Apr. 11 | 29 |
| Formation of Additional A.P.I. Production Chapters Planned. *By H. H. King* | Apr. 18 | 30 |
| Division of Production Central Committee Named | Apr. 18 | 74 |
| Technical Subjects on A.P.I. Mid-Continent Program | May 16 | 65 |
| Engineers Consider Economic Ills at Tulsa Meeting. *By Spencer Robinson* | May 30 | 22 |
| Chapter Hears Discussion of Oklahoma City Drilling | May 30 | 58 |
| Production Big Division of A.P.I. | June 20 | 61 |
| Drumright Chapter A.P.I. Discusses Electric Power | June 27 | 65 |
| Waste Committee Meets at Dallas | June 27 | 63 |
| Institute Directors Meet at Tulsa October 3 | July 11 | 68 |
| A.P.I. Committee on Waste Disposal Meets in Los Angeles | Aug. 1 | 222 |
| Program of Southwestern A.P.I. Production Division Arranged | Aug. 8 | 50 |
| A.P.I. Southwest District Meeting at Galveston | Sept. 5 | 64 |
| Southwest A.P.I. Group Has Instructive Conference. *By Jack Logan* | Sept. 12 | 67 |
| Burbank Production Chapter Holds Meeting | Sept. 26 | 62 |
| Move A.P.I. West Coast Office to Los Angeles | Oct. 17 | 76 |
| Name Division of Production on Fire | Oct. 31 | 57 |
| Busy Sessions in Prospect When A.P.I. Members Meet in Chicago | Oct. 31 | 24 |
| Will Discuss Conservation, Proration, Unitization | Oct. 31 | 57 |
| Plan Mid-Year Meetings for Three Institute Divisions | Nov. 7 | 112 |
| Form San Joaquin Valley Chapter of A.P.I. Pacific Coast Division | Nov. 7 | 123 |
| Symposium of Subjects Before A.P.I. Department of Production at Chicago | Nov. 14 | 25-C |
| Institute Speakers Point Way to Better Times. *By Spencer W. Robinson* | Nov. 14 | 25 |
| Reeser Again Re-Elected President; Penn Vice-President for Production | Nov. 21 | 27 |
| Analysis of Corrosion Cost Recommended in Report | Nov. 21 | 28 |
| Definite Action on Tariff Problem Side-Stepped | Nov. 21 | 29 |
| A.P.I. Votes to Continue Work on Petroleum Research. | Nov. 21 | 29 |
| A.P.I. Meets in Chicago in 1931, Plan Mid-Year Meetings | Nov. 21 | 29 |
| Relation of Earth Temperature and Oil Accumulation Studied | Nov. 21 | 76 |

### American Society of Mechanical Engineers

| | | |
|---|---|---|
| A.S.M.E. Group Visits Oil Fields in Oklahoma | March 28 | 41 |
| A.S.M.E. Program for Tulsa Meeting in October Arranged | Sept. 12 | 120 |

### California Industrial First Aid Meet

| | Date | Page |
|---|---|---|
| Industrial Safety Meet at San Francisco | Apr. 4 | 9 |

### California Oil & Gas Association

| | | |
|---|---|---|
| California Supply Men Plan Chamber Division | March 14 | 26 |
| California Oil & Gas Association Adds Department | Sept. 26 | 8 |
| California Association Names Officers for 1931 | Dec. 26 | 1 |

### California Oil Scouts Association

| | | |
|---|---|---|
| California Oil Scouts Form Association | May 30 | 5 |

### Houston Geological Society

| | | |
|---|---|---|
| Funds for Petroleum Library Sought in Houston | June 13 | 7 |
| Houston Geological Society's New Officers | Nov. 21 | 6 |

### Joseph A. Holmes Safety Association

| | | |
|---|---|---|
| International First Aid Meet | March 28 | 1 |

### Independent Petroleum Association of America

| | | |
|---|---|---|
| Tulsa Meeting Proves Tariff Advocates Mean Business. *By Grady Triplett* | Feb. 7 | 1 |
| Projected Production Curve Used to Show Tariff is Needed. *By James H. Gardner* | Feb. 7 | |
| Tariff Advocates Invade Capitol; Hoover Receives Committee. *By Warren Baker* | Feb. 7 | |
| Committee of Fifteen Calls on President | Feb. 7 | |
| Malloy Discusses Oil Tariff | Feb. 7 | |
| Tariff Advocates Pleased With Progress Made. *By Warren Baker* | Feb. 14 | |
| Statement Presented Congress to Support Tariff Plea. *By Wirt Franklin* | Feb. 14 | |
| Tariff Advocates to Hold Series of Meetings | Feb. 14 | |
| Civic Organizations Indorse Oil Tariff Move | Feb. 21 | |
| Tariff Proponents Planning Washington Demonstration | Feb. 28 | |
| Tariff Proposal Gaining Strength; Sheppard Out With Statement | Feb. 28 | |
| Oil Tariff Beaten in Senate Vote; Franklin Before Committee | March 7 | |
| Tariff Advocates Criticize Fact-Finding Committee of Oil Board | March 21 | |
| Oil Tariff Finally Defeated by Close Vote in Senate | March 28 | |
| Independent Association to Continue Fight for Tariff on Petroleum Imports. *By H. H. King* | April 25 | |
| Independents to Renew Fight for Tariff on Crude | Sept. 26 | |
| Oklahoma Independents Direct Guns at Shell. *By Grady Triplett* | Oct. 3 | |
| I. P. A. A. to Renew Fight for Tariff on Gasoline and Crude | Oct. 17 | |
| Independents Seek Better Understanding. *By H. J. Struth* | Oct. 31 | |
| I. P. A. A. Forms Montana Division Organization | Oct. 31 | |
| Tariff Committee Seeking Data on Crude Costs. *By Clarence L. Linz* | Nov. 7 | |
| Texas Independents Name Technical Advisory Committee | Nov. 28 | |

### Institute of Petroleum Technologists (London)

| | | |
|---|---|---|
| The Institute of Petroleum Technologists | Aug. 1 | |

### International Petroleum Exposition (Tulsa)

| | | |
|---|---|---|
| Exposition Board Named at Tulsa Meeting | Jan. 17 | |
| Tulsa Exposition Space Being Reserved | Apr. 4 | |
| Exposition Committee Adds New Building | May 30 | |
| Tulsa Exposition Space Largely Sold | July 4 | |
| Committee Plans Exhibits for Tulsa Exposition in Fall | Aug. 1 | |
| Sixth Annual First Aid Meet to be Held During Exposition | Aug. 8 | |
| Foreign Countries to Take Part in Tulsa Exposition | Aug. 8 | |
| Finishing Touches Put to Exposition Grounds. *By Grady Triplett* | Sept. 19 | |
| Pre-Exposition Meetings Set for October 3 and 4 | Sept. 26 | |
| Exposition Opening Day Program Now Arranged | Sept. 26 | |
| Exposition Opening Brings Many Interests to Tulsa | Oct. 3 | |
| Events of Interest at the Tulsa Exposition | Oct. 17 | |

### Mid-Continent Oil & Gas Association

| | Date | Page |
|---|---|---|
| Tulsa Meeting Takes First Step Toward General Unitization | Jan. 31 | 192 |
| Mid-Continent Association Favors Oil Tariff. *By H. H. King* | Dec. 12 | 25 |
| McGrew Heads Louisiana-Arkansas Division of Association | Dec. 12 | 26 |

### Mid-Continent Oil Scouts and Land Men's Association

| | | |
|---|---|---|
| Mid-Continent Scouts Hear Opposing Economic Theories | May 30 | 58 |

### National Safety Council

| | | |
|---|---|---|
| Important Conference Features Annual Safety Congress Meet | Sept. 26 | 52 |

### North Texas Oil & Gas Association

| | | |
|---|---|---|
| North Texas Operators Forming New Association | Jan. 31 | 194 |

### Oil Equipment and Engineering Exposition (California)

| | | |
|---|---|---|
| Prospects Bright for Los Angeles Oil Equipment Show | Jan. 24 | 68 |
| Engineers to Discuss Field Problems at Exposition | Feb. 21 | 92 |
| Technical and Mechanical Progress Featured at First California Engineering Exposition | Mar. 14 | 117 |
| California Oil Engineering New Equipment Pages | Mar. 14 | 120.177 |
| Los Angeles Exposition Success Points to Annual Affair. *By Brad Mills* | Mar. 28 | 42 |
| California Exposition Buildings Ready for Second Meeting | Oct. 3 | 212 |

### Oil Map Revision Association

| | | |
|---|---|---|
| Los Angeles Map Men Have Information Exchange | Feb. 7 | 61 |

### Oklahoma Operators Mass Meeting

| | | |
|---|---|---|
| Oklahoma Producers Protest Price Cut; Advance Tariff Issue | Jan. 24 | 37 |
| Oklahoma Operators' Protest Presented to President | Dec. 19 | 34 |

### Rocky Mountain Oil & Gas Association, Montana Division

| | | |
|---|---|---|
| Joint Meeting of Alberta-Montana Oil Men Scheduled December 12 | Dec. 12 | 74 |
| Montana Oil Men Seek Tariff on Oil and Gas | Dec. 19 | 80 |
| Joint Rocky Mountain Meeting Has Constructive Meeting | Dec. 26 | 66 |

### Shreveport Geological Society

| | | |
|---|---|---|
| Shreveport Geologists Make Field Trip | June 27 | 65 |

### Western Petroleum Refiners Association

| | | |
|---|---|---|
| Crawford Heads Western Refiners Association | Mar. 21 | 98 |

### Wichita Falls Independent Operators

| | | |
|---|---|---|
| Wichita Falls Operators Oppose Crude Price Reductions | Jan. 24 | 60 |


## Conservation—Cooperation


| | | |
|---|---|---|
| California Gas Waste Legislation Advanced During Last Year | Jan. 31 | 63 |
| Necessity Forces Effective Conservation in California. *By Brad Mills* | Jan. 31 | 117 |
| Gas Law Constitutionality Vigorously Attacked | Feb. 14 | 74 |
| California Oil Leaders Take Public Into Confidence. *By Brad Mills* | Feb. 21 | 28 |
| Injunction to Stop Gas Waste Significant Development | Mar. 28 | 70 |
| California Gas Waste Injunction Not Fully Effective. *By Brad Mills* | Apr. 4 | 35 |
| Elshire Group Writ Restrains Gas Curtailment Order. *By Brad Mills* | Apr. 18 | 35 |
| Government's Conservation Program Hits Court Snag | Apr. 18 | 72 |
| Reveal Navy Department's Plans to Safeguard U. S. Oil Reserves | May 16 | 77 |
| Oklahoma Supreme Court Upholds Conservation Law | Oct. 17 | 51 |
| Julian Court Decision is Triumph for Conservation | Oct. 24 | 51 |
| California Gas Law Ruling to be Handed Down October 31 | Oct. 24 | 80 |
| Commission Orders State-Wide Investigation of Gas Waste | Nov. 7 | 111 |
| Gas Conservation Offered by Ames as Cure of Industry Ills | Nov. 21 | 25 |
| State Loses in Long Beach Gas Waste Injunction Suit | June 27 | 67 |
| California Gas Conservation Law Held Constitutional | Nov. 14 | 84 |
| Commission Inquiries Into Gas Waste at Pettus | Nov. 21 | 73 |
| Convict Two of Improper Well Abandonments | Nov. 28 | 70 |
| Appeal Court Upholds Hoover's Conservation Policy | Dec. 5 | 26 |
| Two High Court Decisions Uphold Gas Waste Law | Dec. 12 | 27 |
| Legislation to Conserve Oil and Gas Urged by Adams | Dec. 19 | 90 |


## Curtailment—Proration

### General


| | | |
|---|---|---|
| Crude Price Revisions Expected to Stimulate Curtailment | Jan. 24 | 41 |
| Holmes Says Production Control Necessary | Feb. 7 | 61 |
| Government Policy Restricted Development During 1929 | Feb. 14 | 76 |
| Conservation Board Wants Output of Gasoline Curtailed | Mar. 7 | 45 |
| Refiners Favor Curtailment Sponsored by Oil Board | Mar. 14 | 59 |
| Sunday Shut-Down Move Gains Popularity in Mid-Continent | Mar. 21 | 46 |
| Committee Sets 1930 Crude Quota at 943 Million Barrels. *By Clarence L. Linz* | Apr. 18 | 21 |
| Price Cut Follows Uncertainty in Proration | May 23 | 63 |
| Government Figures Show Need for Refinery Curtailment | July 18 | 50 |
| Refiners Joining Curtailment Move; Crude Output Down | July 18 | 53 |
| August Drilling Reflects General Curtailment. *By H. J. Struth* | Sept. 12 | 37 |
| Continuation of Curtailment Had Firming Effect | Sept. 26 | 53 |
| Oklahoma Proration to be Tested by Federal Court | Sept. 26 | 70 |
| Proration Enforcement Held Constitutional by Court | Oct. 3 | 184 |
| Texas Commission Intimates Court Action Possible | Oct. 31 | 23 |
| Need for Drastic Curtailment of Refinery Output. *By Grady Triplett* | Nov. 14 | 23 |
| Limiting Production is Not Restraint of Trade | Nov. 14 | 25b |
| Lessened Oil Demand Makes Curtailment Imperative | Nov. 14 | 25e |
| More Drastic Curtailment Follows Lower Prices | Nov. 14 | 59 |
| Oklahoma and Texas Lead Production Decline | Nov. 14 | 62 |
| Refinery Curtailment Forcing Lower Crude Output | Dec. 12 | 51 |
| New Law Suggested to Control Oil Production | Dec. 5 | 89 |


### CALIFORNIA


| | | |
|---|---|---|
| California Not Satisfied With Curtailment | Jan. 3 | 64 |
| California Curtailment Approaches Critical Period | Jan. 24 | 64 |
| Wilbur Working With Operators on Kettleman Hills Curtailment | Jan. 31 | 207 |
| Wilbur Says Kettleman Hills Control Essential to Industry's Stability | Jan. 31 | 207 |
| Vigilance Required to Hold California to Proration. *By Brad Mills* | Feb. 7 | 21 |
| Outline Plan to Limit California Production | Feb. 7 | 61 |
| California Operators Plan Cut to 600,000 Barrels. *By Brad Mills* | Feb. 14 | 29 |
| Organize Both Sides in Kettleman on Curtailment | Feb. 14 | 74 |
| California Committee Sets State-Wide Proration. *By Brad Mills* | Feb. 28 | 25 |
| First Results Point to Success of California Curtailment | Mar. 7 | 70 |
| California Curtailment Progress Considered Satisfactory | Mar. 14 | 239 |
| Special Committee Plans Balanced Program for California. *By Brad Mills* | May 9 | 23 |
| Minority Opposition Endangers California Curtailment. *By Brad Mills* | May 16 | 29 |
| Kettleman Hills Being Held Under Curtailment | May 16 | 78 |
| Ventura Little Affected by Curtailment Program | May 16 | 78 |
| California Curtailment Unchanged After Crude Price Cut | May 30 | 65 |
| Curtailment Shows Improvement; Gasoline Market Heavier | June 13 | 67 |
| Curtailment Proves No Cure-All for California's Ills. *By Brad Mills* | July 4 | 31 |
| California Above Allowable; Curtailment to Continue. *By Brad Mills* | July 25 | 31 |
| California Faces Another Year of Curtailment. *By Brad Mills* | Aug. 15 | 34 |
| New Methods of Potentials May Affect California Drilling | Aug. 22 | 75 |
| California's Curtailment Has Proven Practical and Necessary | Aug. 29 | 80 |
| Plan Further Reduction of Production | Sept. 5 | 67 |
| California May Agree on Allowable of 575,000 Barrels Daily | Sept. 12 | 93 |
| California Rated Allowable Cut to 540,000 Barrels. *By Brad Mills* | Sept. 26 | 25 |
| California Continues Effort to Reduce Production to 575,000 Barrels | Oct. 10 | 184 |
| The Control of California Oil Curtailment. *By Robert E. Allen* | Oct. 17 | 21 |
| Playa del Rey to be Prorated | Nov. 14 | 62 |
| California Starts Second Year of Conservation Auspiciously | Nov. 21 | 88 |

| | Date | Page |
|---|---|---|
| Consider Plan to Cut California Allowable Further | Nov. 2 | 69 |
| California Curtailment Again Reaches Critical Stage | Dec. 5 | 23 |
| *By Brad Mills* | | |
| Try Lower Allowable Figure in Effort to Lower California Output | Dec. 12 | 52 |
| Elwood Curtailment Failure Weakens Movement | Dec. 19 | 66 |
| Try Lower Allowable Figure in Effort to Lower California Output | Dec. 12 | 52 |
| Elwood Curtailment Failure Weakens Movement | Dec. 19 | 66 |
| California's Allowable Cut to 500,000 Barrels | Dec. 26 | 23 |

## KANSAS

| | | |
|---|---|---|
| Drilling in the Shurr Pool Restricted Under Operator's Agreement | Feb. 21 | 53 |
| Change Prorated Output of Two Kansas Pools | May 9 | 53 |
| Proration of Kansas Production Getting Further Attention | July 18 | 69 |
| Prairie Applies Oklahoma Plan of Proration to Kansas Fields | Nov. 14 | 61 |
| Phillips to Prorate Runs From Kansas on Marginal Basis | Nov. 21 | 74 |
| Voshell Pool Operators Vote to Extend Proration Through January | Dec. 19 | 55 |
| Government Agencies Studying Eastern Kansas' Plight | Dec. 26 | 47 |

## KENTUCKY

| | | |
|---|---|---|
| Western Kentucky Shutdown Effective Another 30 Days | Mar. 7 | 62 |

## NEW MEXICO

| | | |
|---|---|---|
| Hobbs Proration Plans Progress With Opposition Removed | July 4 | 35 |
| *By H. H. King* | | |
| Hobbs Potential Increased as Proration Plans Progress | July 11 | 74 |
| Operators and Officials Agree on Hobbs Curtailment | July 18 | 45 |
| *By H. H. King* | | |
| Hobbs Output to be Cut to 31,715 Barrels | Oct. 24 | 68 |
| Proration Figures, Hobbs Field, New Mexico | Oct. 24 | 71 |
| Hobbs Allowable is Reduced to 31,300 Barrels Daily | Nov. 7 | 115 |
| Continuation of Proration at Hobbs is Approved | Dec. 26 | 60 |

## OKLAHOMA

| | | |
|---|---|---|
| Curtailment Reduces Oklahoma City Production to 70,000 Barrels | Jan. 31 | 191 |
| Oklahoma Meetings to Consider Proration Extension | March 14 | 60 |
| Oklahoma Proration Extended; Seek Means of Price Raise | March 21 | 63 |
| Oklahoma Curtailment Order Extended from April 1 | April 4 | 38 |
| Four Prospective Oklahoma Pools Placed Under Proration | May 23 | 58 |
| Committee to Co-operate on Proration in Oklahoma | June 13 | 53 |
| Oklahoma Proration Committees Plan Third Quarter Curtailment | June 20 | 37 |
| *By Floyd Swindell* | | |
| Oklahoma Operators Initiate Proration Order | July 4 | 34 |
| Further Curtailment in Oklahoma Asked of Commission | July 18 | 38 |
| *By Grady Triplett* | | |
| Few Protests Filed to Prairie Action in Curtailing Runs | July 18 | 64 |
| Oklahoma Limit 550,000 Barrels Official | July 25 | 73 |
| Proration Success Outstanding During Past Year | Aug. 1 | 134 |
| *By Floyd Swindell* | | |
| Southern Oklahoma Fields on Proration Basis Since August 10 | Aug. 15 | 51 |
| Oklahoma City Producers Threaten State Proration Program | Aug. 22 | 59 |
| Commission Authority Due for Court Test at Oklahoma City | Aug. 22 | 68 |
| Oklahoma Production Set at 550,000 Barrels Daily | Aug. 29 | 37 |
| *By Grady Triplett* | | |
| Oklahoma City Proration is Delayed Week by Court | Sept. 5 | 57 |
| Supreme Court Delays Decision in Proration Suit | Sept. 12 | 83 |
| Await Decision in Oklahoma City Proration Row | Sept. 19 | 78 |
| Hearing of Contempt Citations Again Postponed to October 6 | Sept. 26 | 56 |
| Cement Pool Allowable Cut to 40 Per Cent | Sept. 26 | 67 |
| Proration Plan Gives Oklahoma City 130,000 Barrels Daily | Oct. 10 | 53 |
| *By Grady Triplett* | | |
| Oklahoma Proration Meets Opposition at Hearing | Oct. 17 | 51 |
| Oklahoma Commission Further Restricts Proration | Nov. 7 | 103 |
| Richards Heads Oklahoma Proration Committee | Nov. 7 | 103 |
| Suggested Potential and Allowable Production of Crude Oil—State of Oklahoma, October 31 to December 31, 1930 | Nov. 7 | 104 |
| Issues New Proration Order for Oklahoma City Field | Nov. 14 | 64 |
| Commission Appoints Collins Umpire of Proration | Nov. 21 | 76 |
| Oklahoma and Kansas Proration Meets Postponed to December | Nov. 28 | 75 |
| Prairie Withdrawal Calls for New Proration in Oklahoma | Dec. 5 | 63 |
| Oklahoma Proration Opponents May Take Question Before Legislature | Dec. 12 | 53 |
| Proration Violation Boosts Oklahoma City Output | Dec. 12 | 67 |
| Producers, Purchasers, Pipe Line Men to Meet | Dec. 12 | 70 |
| Oklahoma Organizing Opposition to Proration Appeal | Dec. 19 | 27 |
| *By Grady Triplett* | | |
| Oklahoma Allowable Cut to 465,000 Barrels | Dec. 26 | 55 |

## TEXAS

| | | |
|---|---|---|
| Curtailment of Crude Runs Halts Wilbarger Field Work | Jan. 17 | 55 |
| Texas Operators Propose Restoring Price by Curtailment | Jan. 24 | 38 |
| Texas Committee Agrees on Drastic Production Cut | Jan. 31 | 46 |
| Texas Curtailment Committee Expected to Recommend 100,000 Barrel Cut | Feb. 7 | 35 |
| *By H. J. Struth* | | |
| Proration of Panhandle Fields Extended | Feb. 7 | 53 |
| Texas Committee Makes Progress in Curtailment Plan | Feb. 14 | 34 |
| *By H. H. King* | | |
| Texas Curtailment Committee Seeks Government Aid | Feb. 21 | 29 |
| Co-operation Lacking in Texas Curtailment Efforts | Feb. 28 | 27 |
| *By H. H. King* | | |
| Extend Proration Term in Howard-Glasscock | Feb. 28 | 54 |
| Panhandle Operators Approve Plan of Proration Extension | March 7 | 65 |
| Proration and Its Effects in the Yates Pool | March 14 | 58 |
| *By R. W. Richmond* | | |
| Texas Company Abandons Panhandle Proration | March 14 | 217 |
| Panhandle Proration Proposed Provokes Controversy | March 21 | 65 |
| Operators Divided in Hearing on Panhandle Proration | March 28 | 57 |
| Darst Creek Output Continues Above Allowance | March 28 | 64 |
| Commission Holds Hearing on Darst Creek Drilling | March 28 | 69 |
| Texas Operators Renew Efforts to Curb Crude Production | April 4 | 38 |
| Yates Proration Meeting Called; May Loosen 20,000 Barrels | May 9 | 53 |
| Winkler Proration Extended Another Six Months | May 9 | 56 |
| Darst Creek Allowable Now 23,829 Barrels Daily | May 9 | 61 |
| Darst Creek Operators Adhere to Proration Quotas | May 16 | 81 |
| Committee Seeks Data on Texas Crude Requirements | June 20 | 54 |
| West Texas Proration Revision Up for Consideration | June 20 | 55 |
| Young County Operators Agree to Proration Plan | June 27 | 58 |
| Large West Texas Area Nears Proration | July 11 | 48 |
| Howard-Glasscock Proration Change Follows Hearing | July 11 | 69 |
| Official Proration of Darst Creek Under Advisement | July 11 | 74 |
| Operators Move to Reduce Output of Texas Below Current Demand | July 18 | 38 |
| Technical Committee Finds Texas Demand 736,860 Barrels | July 18 | 41 |
| *By H. J. Struth* | | |
| Proration Hearing Set for July 30 at Austin | July 25 | 65 |
| Attempt to Cut Texas Back 125,000 Barrels | Aug. 1 | 197 |
| *By H. J. Struth* | | |
| Darst Creek Proration Collapses; Production Jumps | Aug. 1 | 217 |
| Equitable Proration in Texas Would Cause Little Hardship | Aug. 8 | 25 |
| *By H. J. Struth* | | |
| Darst Creek Operators Reach Agreement on Proration | Aug. 8 | 70 |
| Action on Texas Proration Expected Soon | Aug. 15 | 58 |
| Darst Creek Quota Set at 42,211 Barrels Daily | Aug. 15 | 62 |
| Texas Production Curb Assures Early Stabilization | Aug. 22 | 69 |
| *By H. J. Struth* | | |
| State Proration Added to Unit Control of Van Production | Aug. 22 | 69 |
| Pettus Curtailment Needed to Halt Price Reduction | Aug. 22 | 72 |
| Darst Creek and Salt Flat Fields Under Rigid Proration | Aug. 22 | 74 |
| Coastal Operators Organize to Observe Curtailment Order | Aug. 22 | 78 |
| Texas Allowable Production Revised to 775,000 Barrels | Aug. 29 | 38 |
| *By H. J. Struth* | | |
| Texas Proration Launched by Efficient Committee | Aug. 29 | 38 |
| Texas Production Curtailment Aided by Decline | Aug. 29 | 67 |
| Proration Will Make Possible Original Lease Pooling Agreement at Van | Sept. 5 | 59 |
| Pettus Field Placed on 60-day Proration by Committee | Sept. 5 | 62 |
| Ten Umpires Required to Handle Texas Proration Program | Sept. 12 | 86 |
| Proration in North Texas Halts Field Work | Sept. 12 | 88 |
| Howard-Glasscock Operators Ask Chalk Allowable Increase | Sept. 26 | 69 |
| Danciger Gets Temporary Injunction Against Proration Order | Oct. 3 | 164 |
| Young County Operators Get Injunction Against Proration | Oct. 10 | 180 |
| Start Gauging Darst Wells for Proration Schedule | Oct. 10 | 183 |
| Texas Panhandle Proration Breakdown in Prospect | Oct. 17 | 69 |
| Commission Plans to Reduce Darst Allowable October 25 | Oct. 17 | 72 |
| Darst Creek Quota Higher Pending Hearing | Oct. 24 | 73 |
| North Texas Operators Seek Proration Adjustment | Oct. 31 | 21 |
| Darst Allowable Set at 30,000 Barrels for 90-day Period | Oct. 31 | 22 |
| Railroad Commission Insists that Orders Must be Obeyed | Oct. 31 | 23 |
| Texas Proration Equality Hard to Obtain | Nov. 14 | 71 |
| Winkler Proration Votes for Another Six Months | Nov. 14 | 72 |
| Railroad Commission's Rights to Prorate Production on Trial | Nov. 14 | 73 |
| Commission to Seek Relief for Panhandle Operators | Nov. 14 | 74 |
| Hearing Called to Adopt Rules for Pettus Operators | Nov. 14 | 80 |
| Legal Action Challenges Darst Creek Proration | Nov. 14 | 84 |

| | Date | Page |
|---|---|---|
| Proration to Continue in Salt Flat Field for 90-day Period | Nov. 14 | 81 |
| Panhandle Operators Air Grievances at Meeting | Nov. 21 | 24 |
| Texas Committee Figures are Revised Downward | Nov. 21 | 73 |
| Commission Order Limits Texas Output to 680,238 Barrels | Nov. 28 | 23 |
| Texas Crude Demand Placed at 680,000 Barrels. *By H. J. Struth* | Nov. 28 | 61 |
| Van Increase Has Effect Upon Proration in Three States | Nov. 28 | 79 |
| Cut Allowable in West Texas and Panhandle | Dec. 12 | 70 |
| Withdraw Court Advantage on Proration in North Young County | Dec. 19 | 55 |
| Texas Division Pledges Further Support to Proration | Dec. 19 | 63 |
| Neff Refuses Approval of Commission Order on Marginal Wells | Dec. 26 | 57 |


# Engineering, Technical, Research

## ENGINEERING—ECONOMIC

### Unit Development


| | | |
|---|---|---|
| Unitization Conference at Tulsa Jan. 22; Committee Named | Jan. 10 | 63 |
| Co-operative Drilling Plan on California Tidelands | Jan. 17 | 66 |
| Unit Operation Among Subjects for A. I. M. E. Session | Jan. 24 | 67 |
| Unit Control Gaining Favor in Oklahoma-Kansas. *By Warren Baker* | Jan. 31 | 138 |
| "Unitization" Means Co-operation. *By Capt. J. F. Lucey* | Feb. 7 | 22 |
| Suggested Development Plan Under Unit Operation. *By Robert E. Allen* | Feb. 7 | 25 |
| Unitization Movement Taking Definite Form. *By Warren Baker* | Feb. 7 | 27 |
| The Washington Viewpoint on Unitization. *By Dr. George Otis Smith* | Feb. 21 | 37 |
| AIME Reviews Progress of Unit Operation Plan. *By H. J. Struth* | Feb. 21 | 35 |
| Davis Heads A. P. I. Committee on Unit Operation | Feb. 21 | 50 |
| Unit Development Plan for Nie Section Block | Feb. 21 | 50 |
| Federal Oil Board Report Endorses Unit Operation | June 6 | 23 |
| Proposed Unit Lease Law Approved by Wilbur | June 20 | 66 |
| Federal Law Would Permit Unitizing of Leases | July 4 | 72 |
| Second Van Unit Program Awaits Formal Action of Parties | July 18 | 63 |
| Development of Unitized Van Area to be Pushed | Aug. 15 | 57 |
| Schleicher County to Have Unitized Field Development | Sept. 19 | 81 |
| Van Field Example of Unit Efficiency. *By W. C. Morris* | Oct. 3 | 67 |
| Unit Operation Gets Most Time on Institute's Production Program at Chicago | Oct. 7 | 31 |
| Herndon Sees Unit Operation Cure for Overproduction | Oct. 17 | 35 |
| Kettleman Hills Operators Reach Agreement on Unit Plan | Oct. 24 | 79 |
| First Year of Van Unitized Plan Completed | Nov. 7 | 113 |
| Unit Operation is Central Theme for Division of Production Discussions | Nov. 21 | 26 |
| Engineering and Economic Aspect of Unit Operation. *By T. E. Swigart* | Nov. 21 | 30 |
| Land and Lease Aspects of Unitization. *By John P. West* | Nov. 21 | 40 |
| Engineering and Economic Aspects of Unit Operation. *By T. E. Swigart* | Nov. 28 | 32 |


## ENGINEERING—EXPLORATION

### Geological and Geophysical


| | | |
|---|---|---|
| Geophysics Responsible for 14 New Fields in Gulf Coast. *By Jack Logan* | Jan. 31 | 145 |
| Does Florida Promise Oil? *By Edward A. Hill* | Feb. 21 | 32 |
| The Oil Fields of Alberta. *By E. H. Cunningham Craig* | Feb. 28 | 70 |
| Stereoreflector Advancement in Aerial Surveying. *By Jack Logan* | March 7 | 24 |
| Wide Range of Subjects Included in Geologists Program | March 7 | 75 |
| Government Reports on Kern County Geology | April 11 | 86 |
| Darst Creek Field is Monument to Accuracy of Geologic Findings. *By Jack Logan* | May 23 | 26 |
| Three Geology Courses at S. S. C. Summer Session | June 6 | 70 |
| Shreveport Geologists Plan Annual Field Trip | June 20 | 110 |
| Oklahoma Geology Party Makes Field Trip | June 27 | 65 |
| Block Acreage, Central Louisiana Tests | July 18 | 83 |
| Geoelectrical Exploration Methods used in Oil Fields. *By Helmer Hedstrom* | July 25 | 34 |
| Numerous Geophysical Prospects Prove Disappointments. *By Jack Logan* | Aug. 1 | 136 |
| Geoelectrical Methods Used in Exploration of Oil Fields. *By Helmer Hedstrom* | Aug. 8 | 32 |
| Two Great Producing Horizons in Southwest Texas. *By Richard A. Jones* | Aug. 22 | 38 |
| In Defense of Geophysics. *By John F. Weinzierl* | Aug. 29 | 46 |
| Types of Oil Field Structures. *By W. F. Cloud* | Aug. 29 | 55 |
| Physical and Chemical Characteristics of Oil Sands. *By W. F. Cloud* | Sept. 12 | 40 |
| Geophysics and Deep Drilling Shape Destiny of Gulf Coast. *By Jack Logan* | Oct. 3 | 63 |
| Barbers Hill Dome Pictured as Cone With Point Down. *By Jack Logan* | Oct. 10 | 27 |
| Development Program in a Part of the Ventura Avenue Oil Field. *By Joseph Jensen and F. W. Hertel* | Oct. 24 | 34 |
| Tulsa Geologists Hear Interesting Paper on Kansas | Nov. 14 | 74 |


## ENGINEERING, DRILLING and PRODUCTION

### Drilling Methods—General


| | | |
|---|---|---|
| Ventura River Bed Operations Require Special Methods and Ingenius Appliances | Feb. 14 | 46 |
| Better Drilling. *By F. F. Hill* | April 18 | 26 |
| Drilling and Producing Operations in Kettleman Hills. *By R. I. Brown* | April 25 | 31 |
| Depth Record for Cable Tools not Excessively Costly. *By H. H. King* | May 16 | 30 |
| Well Drilling Chart Gives Daily Record with Costs. *By Wm. H. McGrew* | May 30 | 29 |
| Improved Technique and Safety Mark Modern Developments at Long Beach. *By Brad Mills* | Sept. 26 | 26 |
| Advanced Methods and Equipment. *By W. A. Sawdon* | Oct. 3 | 61 |
| Cable Tools now Entering Polish Oil Fields. *By T. S. Szwabowicz* | Nov. 7 | 60 |


### Production Methods—General


| | | |
|---|---|---|
| The Problem of Drainage at Kettleman Hills. *By Stanley C. Herold* | March 28 | 32 |
| Engineers Look Forward on Oklahoma City Problems. *By Floyd Swindell* | May 30 | 23 |
| Economic Lease Development Involves Close Check on Costs. *By Grady Triplett* | May 30 | 30 |
| This Oklahoma City Lease Arranged Like an Efficiency Kitchen. *By Floyd Swindell* | June 6 | 24 |
| Oil is Still Produced by Manual Methods in Roumania | Aug. 1 | 85 |
| Marginal Oil Fields—Problems in Connection with Their Operation. *By Geo. O. Suman* | Aug. 15 | 23 |
| Uniform Controlled Flow of Oil Versus Intermittent Open Flow. *By I. B. Williams* | Oct. 3 | 85 |
| Increasing the Ultimate Recovery of Oil. *By S. F. Shaw* | Oct. 31 | 34 |
| Improvement in Production Practice. *By W. W. Scott* | Nov. 14 | 26 |
| Utilization of Energy Available in Gas as the Result of High Pressure Gas-oil Separation. *By H. A. Brett* | Nov. 14 | 40 |
| Determination of Potential Production of Wells Without Open Flow Test. *By T. V. Moore* | Nov. 14 | 44 |


### Bibliography


| | | |
|---|---|---|
| Bureau of Mines Publishes Bibliography of Petroleum | Feb. 28 | 74 |


### Bits, Dressing


| | | |
|---|---|---|
| Care Should Be Taken in Dressing Bits. *By Brad Mills* | Aug. 15 | 26 |


### Boilers, Efficiency


| | | |
|---|---|---|
| Handy Chart for Determining Boiler Efficiency. *By W. F. Schaphorst* | July 4 | 37 |


### Boilers, Insulation


| | | |
|---|---|---|
| Advantages of Insulation on Oil Field Boilers. *By W. H. Meier* | Sept. 19 | 49 |


### Boiler, Water Heaters


| | | |
|---|---|---|
| Bureau of Mines Report Shows Use of Boiler-Water Heater with Rotary | Aug. 8 | 85 |


### Cementing


| | | |
|---|---|---|
| The Use of Hydraulic Cement in Oil Wells. *By J. B. Case* | Feb. 14 | 80 |
| Screen Set Before Cementing of Oil String in Gulf Coast | Dec. 26 | 38 |


### Cleaning Wells


| | | |
|---|---|---|
| Special Method and Apparatus Used in Cleaning Out Trinidad Wells. *By Jack Logan* | Jan. 24 | 25 |

| | Date | Page |
|---|---|---|
| **Completion Methods** | | |
| Control of Kettleman Hills Wild Well Points to Heavier Fittings — *By Brad Mills* | Jan. 24 | 23 |
| Two New Completion Methods Tried Out at Oklahoma City | June 27 | 64 |
| Composition of Zwolle Marl—Best Methods for Completing Wells in New Formation — *By H. D. Easton* | Sept. 26 | 36 |
| Oklahoma City Completion Method Reduces High Pressure Well Dangers to a Minimum — *By Floyd Swindell* | Sept. 12 | 64 |
| Washing in Under Pressure Successful in Oklahoma — *By Floyd Swindell* | Nov. 28 | 25 |
| Hook-up to Handle Sand Blast at Oklahoma City — *By Floyd Swindell* | Dec. 5 | 24 |
| **Corrosion** | | |
| Aluminum Foil Protective Coatings for the Oil Industry — *By Standley Gill, Walter F. Rogers and Stanton U. McGary* | Jan. 31 | 51 |
| Protecting of Buried Pipe Lines Against Corrosion — *By Stanley Gill* | March 14 | 65 |
| Salt Water Disposal Line Coated Inside and Out — *By Warren Baker* | March 14 | 184 |
| Asphalt Coating to Protect Pipe Line from Corrosion — *By Jack Logan* | March 21 | 32 |
| Methods of Covering Pipe to Prevent Corrosion — *By Wm. Moeller, Jr.* | April 10 | 26 |
| Pipe Protection — *By George Wehrle* | May 9 | 28 |
| Tanker Protection Given to the Public | May 16 | 36 |
| Methods of Sealing the Seams of Aluminum Foil Tank Coatings — *By Stanley Gill* | June 20 | 28 |
| **Crooked Holes** | | |
| Mormulae for Acid Bottle Determination — *By Alexander B. Morris* | Jan. 10 | 30 |
| Developments in Acid Bottle Surveying Aid Accuracy — *By Brad Mills* | Feb. 14 | 35 |
| Accuracy of Bore Hole Surveying by Orientation from the Surface — *By R. P. McLaughlin* | March 21 | 23 |
| Crooked Hole Problems in the Gulf Coast — *By P. C. Murphy and Sidney A. Judson* | March 21 | 28 |
| New Machine for Determining Off Vertical Direction of Oil Tests — *By Warren Baker* | March 28 | 40 |
| Legal Aspects of Directional Surveys of Wells — *By A. T. Parsons* | April 11 | 60 |
| Bore Hole Declination Recorder and Strata Meter | May 9 | 25 |
| Progress in Straight Hole Drilling | May 9 | 30 |
| Underground Surveying now Standard Practice in California — *By Brad Mills* | May 16 | 83 |
| Crooked Hole Surveying Made Simple by Syfo Clinograph | June 25 | 38 |
| **Deep Drilling** | | |
| Deepest Hole on Texas-Louisiana Gulf Coast 8150 Feet — *By Richard A. Jones* | Feb. 28 | 28 |
| Review of Drilling Below 5000 Feet in West Texas — *By Richard A. Jones* | June 6 | 28 |
| Cost of Drilling Deep Oil Wells at Oklahoma City | June 20 | 57 |
| **Diesel Engines** | | |
| Diesel Plant Provides Electric Current for Wildcat Drillings — *By Brad Mills* | July 4 | 36 |
| **Derricks—Foundations** | | |
| Derricks Built on Piles in Maracaibo Lake — *By Roy E. Leigh* | March 7 | 22 |
| Elwood Pier Building an Important Engineering Achievement — *By Brad Mills* | May 16 | 33 |
| Elwood Derrick Floor Eliminates Cellar — *By Brad Mills* | Nov. 7 | 72 |
| Oklahoma City Loads and Soil Demand Special Engineering on Derrick Foundations — *By I. P. Bingham* | Dec. 26 | 26 |
| **Drilling Mud** | | |
| Hydraulic Mining Methods for Mixing Rotary Mud | Feb. 14 | 38 |
| Admixtures in Rotary Mud — *By C. P. Parsons* | June 20 | 34 |
| Treatment of Mud Fluid in California — *By E. L. Decker* | June 27 | 31 |
| Central Mud Cleaning Plants Reclaiming Methods — *By Brad Mills* | Oct. 10 | 56 |
| Vibrating Screen Cleans Mud—Make a Big Saving — *By Brad Mills* | Oct. 17 | 25 |
| Characteristics of Drilling Fluid — *By C. P. Parsons* | Nov. 7 | 77 |
| Centrifugal Separator Removes Sand from Drilling Mud — *By Brad Mills* | Nov. 7 | 84 |
| The Mud Problem in Rotary Drilling — *By W. A. Sawdon* | Dec. 12 | 28 |
| **Electric Power Costs** | | |
| Keep Close Tab on Power Cost on Record Electric Well — *By H. J. Struth* | Oct. 31 | 32 |
| **Equipment—Special** | | |
| "Wild" Mary Sudik Under Control After 11 Days' Effort — *By Grady Triplett* | April 11 | 26 |
| Special Equipment Used on Mary Sudik Proves Efficient — *By Grady Triplett* | April 18 | 24 |
| New Fishing Tools Invade Mid-Continent | June 2 | 116 |
| Roumanians Transmit Energy to Draw Works by Hydraulic Power | Aug. 1 | 81 |
| Roumanian Uses War Knowledge in Performing Casing | Aug. 29 | 44 |
| Equipment and Methods of Preventing Blow-Outs in Drilling | Sept. 12 | 53 |
| New Hydraulic Brake Has Positive Action — *By Brad Mills* | May 2 | 47 |
| Control Head Stands Gas-Driven Sands at High Pressure — *By Floyd Swindell* | July 18 | 48 |
| Special Appliances Hurry Control of Santa Fe Springs Fire — *By Brad Mills* | July 18 | 42 |
| Turbine Air Lift Pump Applies New Principles — *By Brad Mills* | Aug. 29 | 43 |
| Casing Perforating Gun Used Successfully in Arkansas | Aug. 29 | 45 |
| Hook-Off Adjuster Popular at Burbank | Oct. 10 | 33 |
| **Fire** | | |
| Comar Oil Company Lease Boasts Model Fire-Proof Rig — *By Warren Baker* | Jan. 17 | 35 |
| Moreni's Burning Well Defeats All Efforts at Control — *By Roy E. Leigh* | Aug. 22 | 42 |
| **Flooding** | | |
| Valuation of Flood Oil Properties — *By Eugene E. Stphenson and I. G. Grettum* | Feb. 21 | 25 |
| Recent Developments in Flooding Practice in the Bradford and Richburg Fields — *By C. R. Fettke* | Mar. 7 | 32 |
| **Gas Engine Lubrication** | | |
| Lubrication of Gas Engines — *By D. H. Foster* | Oct. 3 | 89 |
| **Study of Gas Fields** | | |
| The Sudy of Gas Field — *By E. L. Rawlins* | May 16 | 40 |
| **Gas Lift Methods** | | |
| Injection of Distillate Helps Gas Lift on Heavy Oils — *By Brad Mills* | Sept. 19 | 43 |
| Gas Lift Method of Flowing Wells in California | Oct. 3 | 82 |
| Adaption of Gas Lift to Wells of Small Size — *By S. F. Shaw* | Nov. 14 | 50 |
| Gas Lift Checks Decline—Lowers Cost at Elwood — *By Brad Mills* | Dec. 26 | 24 |
| **Gas Oil Ratios** | | |
| Has There Been Waste at Seminole? — *By S. F. Shaw* | Feb. 7 | 31 |
| Losses Occurring from Disregard of Gas Proportions at Seminole — *By Harry Pennington* | Mar. 7 | 27 |
| Wastes—That Occur in Oil Fields — *By S. F. Shaw* | Apr. 11 | 32 |
| The Significance of Gas Oil Ratios — *By Ray E. Koller* | May 23 | 28 |
| **Gas Storage Methods** | | |
| Plan Storing Turner Valley Gas in Exhausted Bow Island Sand | July 25 | 74 |
| **Gas Well Siphons** | | |
| Siphons for Removal of Water from Natural Gas Well | Feb. 28 | 62 |
| **Gauging and Gauging Practice** | | |
| The Use of Meters to Gauge Fluid Production of a Well — *By H. A. Brett* | Nov. 14 | 50 |
| Individual Meters for Lease Gauging — *By Brad Mills* | June 27 | 26 |
| **Mining** | | |
| Mining Accounts for Third of Germany's Oil Output — *By Roy E. Leigh* | Dec. 5 | 56 |
| French Mining Method Points Way to Complete Recovery | Aug. 1 | 118 |
| **Oil Storage Methods** | | |
| Storing Oil in Depleted Sand Successfully Tried — *By Brad Mills* | Feb. 14 | 51 |
| **Pipe Salvaging** | | |
| Deep Rock Salvages Old Pipe for New Construction | June 13 | 50 |
| **Portable Drilling Units** | | |
| Union Oil Develops Portable Outfit for Shallow Drilling — *By Brad Mills* | Dec. 5 | 44 |
| **Determining Potentials** | | |
| Determination of Potentials Discussed at Session | Nov. 21 | 28 |

| | Date | Page |
|---|---|---|
| **Publications** | | |
| Bureau of Mines Publications Available to Industry | May 2 | 91 |
| **Pumping** | | |
| Swabbing in Poland's Most Important Production Method — *By T. S. Swabowic* | Mar. 28 | 29 |
| Submergible Electric Pump Proves Possibilities in Field Test — *By Warren Baker* | Mar. 7 | 26 |
| New Hydraulic Pump for Deep Wells | Apr. 4 | 32 |
| Weighing Wells — *By L. S. Thompson* | May 30 | 31 |
| Depthometer Assists in Swabbing Operation in Poland — *By Roy E. Leigh* | July 11 | 43 |
| Pumping Research in California — *By Robinson and Robertson* | Aug. 1 | 234 |
| Larger Horsepower Ratings for Drilling and Pumping — *By H. E. Dralle* | Oct. 3 | 27 |
| Concordia Long Stroke Pump Designed for Deep Wells in Roumania — *By Roy E. Leigh* | Oct. 3 | 96 |
| The Why of Clockwise and Counterclockwise Pumping — *By L. A. Little* | Oct. 10 | 62 |
| The Mechanics of Oil Well Pumping — *By H. E. Dralle* | Nov. 28 | 28 |
| **Repressuring** | | |
| Problems in Air and Gas Injection in Producing Oil Sands — *By E. V. Foran* | Apr. 11 | 29 |
| California Gas Law Enforcement Revives Interest in Repressuring | Apr. 11 | 61 |
| Migration of Natural Gas from Injection Wells | June 20 | 61 |
| Repressuring Project at Haynesville Successful | July 25 | 78 |
| Factors Affecting Efficiency of Gas-Driven Methods | Sept. 19 | 61 |
| Maintenance of Pressure at Sugar Land — *By George Reid* | Nov. 7 | 49 |
| Conservation and Utilization of Gas, Sugarland Oil Field, Texas — *By Mercer Parks* | Nov. 14 | 32 |
| A Repressuring Experiment Project to Measure the Effect of Early Gas Injection — *By H. D. Wilde, Jr.* | Nov. 14 | 28 |
| Producing Oil with Minimum Pressure Decline at the Sugarland Field — *By H. D. Wilde, Jr.* | Nov. 14 | 29 |
| Haynesville Repressuring Project Proves Highly Successful — *By W. W. Moore* | Dec. 19 | 28 |
| **Research** | | |
| Determine Strength of Oil Shales by Compression | June 20 | 64 |
| Flow Characteristics of Saturated and Unsaturated Crude Oil — *By W. F. Cloud* | Sept. 19 | 40 |
| Effect of Edge Water on Recovery of Oil — *By H. H. Wright* | Oct. 17 | 36 |
| Bureau of Mines Report of Year's Research | Dec. 5 | 70 |
| Characteristics which Determine the Value of Oil Zones — *By George O. Suman* | Dec. 12 | 39 |
| **Rotary Sprocket Chains** | | |
| Lubrication of Rortary Sprocket Chains — *By C. R. Weiss* | Sept. 26 | 33 |
| **Sample Washing** | | |
| Machine Washes Samples Better and More Quickly Than Hand | Apr. 4 | 35 |
| **Separators** | | |
| Proper Methods of Installing Oil and Gas Separators — *By E. H. Adams* | Sept. 26 | 41 |
| **Shooting Methods** | | |
| Oil Well Shooting Methods and Equipment — *By W. F. Cloud* | Oct. 24 | 29 |
| **Tanks, Breather Roofs** | | |
| A Diaphragm or "Breather" Roof for Oil Storage Tanks — *By Ludwig Schmidt* | Mar. 14 | 107 |
| **Tanks, Insulating** | | |
| Bamboo Used for Insulating Tanks in South America | May 2 | 87 |
| **Tanks, Welded** | | |
| Welded Tanks Becoming Popular in California — *By Brad Mills* | Mar. 14 | 211 |
| **Treating** | | |
| Treating Crude Oil Emulsions — *By Chas. D. Miller* | June 6 | 31 |
| **Tubing Wells** | | |
| Running Tubing Under Pressure Gains Favor in California — *By Brad Mills* | July 11 | 49 |
| Effects of Tubing Flowing Wells, Yates Field — *By H. H. Harrison* | Sept. 12 | 46 |
| Automatic Control Head Makes Possible Running or Pulling Tubing Under Pressure | Oct. 10 | 61 |
| Tubing Wells Under Pressure — *By H. A. Brett* | Nov. 14 | 36 |
| Installation of Tubing in Big Lake Wells Producing | Nov. 21 | 77 |
| Work Progressing Tubing Deep Wells at Big Lake | Dec. 12 | 71 |
| Big Lake Tubing Program Meets First Mechanical Mishap | Dec. 19 | 74 |
| **Standardization** | | |
| Louisiana Formations to be "Standardized" | Feb. 14 | 100 |
| Are American Standard Pipe Taps Suitable for A.P.I. Line Pipe? — *By S. B. Terry* | May 2 | 48 |
| **Waste Disposal** | | |
| Long Beach Waste Handled by Unit Disposal System — *By Brad Mills* | June 20 | 26 |
| **Weight Indicators** | | |
| Weight Indicators Should be Treated as Instruments — *By George Reid* | Feb. 14 | 39 |
| **Wire Lines** | | |
| Effective Lubrication Essential for Wire Rope in Field Service — *By H. L. Kauffman* | Jan. 10 | 32 |
| **ENGINEERING—PIPE LINES AND TRANSPORTATION** | | |
| Airplane Locates Gas Leaks | Feb. 28 | 80 |
| Aerial Photography Facilitates Pipe Line Location — *By Jack Logan* | Mar. 14 | 179 |
| Coates Pump Station Pride of the Empire System | Mar. 14 | 198 |
| New Wrinkles in Welded Line for River Crossings — *By R. W. Boggs* | Mar. 14 | 70 |
| Largest Submarine Oil Line Constructed on Shore | Mar. 14 | 241 |
| Developments in Pipe Line Welding Practice and Equipment — *By H. L. Kauffman* | Mar. 14 | 248 |
| Suspension Bridge Eliminates Hazardous Under-River Crossings for Pipe Lines | Mar. 28 | 39 |
| Structural Steel and Pipe Line Welding — *By O. A. Tilton* | May 2 | 95 |
| Munce Compressor Station Largest Gas Engine Driven — *By George Reid* | July 11 | 45 |
| Lone Star Reconditions 40 Miles of 12-Inch Line | July 25 | 74 |
| Pure-Van Line Completed in Record Time — *By W. C. Morris* | Sept. 19 | 55 |
| Four Grades Through Gasoline Line Without Mixing | Oct. 31 | 30 |


# Economics—Crude Markets—Statistics

## ECONOMIC SITUATION


| | Date | Page |
|---|---|---|
| Year's Profit Depends on Curtailment | Jan. 3 | 65 |
| Refinery Runs Should Not Exceed 1929 Total — *By H. J. Struth* | Jan. 10 | 23 |
| Bureau Reports Progress on Shale Utilization | Jan. 10 | 34 |
| West Coast Enters New Year in Better Shape | Jan. 10 | 66 |
| Overproduction was World in 1929 — *By H. J. Struth* | Jan. 17 | 21 |
| Fuel Oil Surplus Recalls Pioneering in California — *By Brad Mills* | Jan. 17 | 25 |
| Texas Production Question Tied Up with California Situation, Farish Tells The OIL WEEKLY | Jan. 24 | 39 |
| California Gascline Shipments to East Coast Probably Will Not Increase in 1930 — *By W. E. Green* | Jan. 31 | 43 |
| 1930 Production Limits Prescribed by Demand — *By H. J. Struth* | Jan. 31 | 47 |
| Economic Progress Made During 1929 — *By H. J. Struth* | Jan. 31 | 55 |
| North Louisiana-Arkansas Area Loses in Annual Output — *By W. W. Moore* | Jan. 31 | 88 |
| Deep Drilling Responsible for California Excess | Jan. 31 | 119 |
| Production Excess Now 252,573 Barrels Daily | Jan. 31 | 181 |
| Refinery Charging Capacity Being Materially Increased | Jan. 31 | 204 |
| Controlled Gasoline Supply the Key to Oil Prosperity — *By H. J. Struth* | Feb. 21 | 21 |
| Refinery Expansion Program Continued During February | Mar. 7 | 31 |
| Economic Position of California Moving Oil to Atlantic Seaboard — *By Brad Mills* | Mar. 14 | 61 |
| Industry in California is Passing Through Adjustment Period — *By Brad Mills* | Apr. 25 | 25 |
| Economic Situation in Texas Demands Lower Production — *By H. J. Struth* | Apr. 25 | 25 |

| | Date | Page |
|---|---|---|
| Natural Gas Industry's Future Linked with Southwest | May 2 | 39 |
| *By H. J. Struth* | | |
| Carbon Black Production is Cut 25 Per Cent | May 2 | 98 |
| Large Expenditures to Accompany Natural Gas Development | May 16 | 38 |
| *By H. J. Struth* | | |
| Low Prices and High Water Retard Production | May 30 | 39 |
| California Distribution of Natural Gas Increases | June 6 | 70 |
| Need for Curtailment of Refinery Runs Still Urgent | June 27 | 39 |
| More Refinery and Gasoline Plant Expansion Indicated | July 11 | 42 |
| *By George Reid* | | |
| Standard of California Moves to End Price War | July 18 | 56 |
| What Constitutes Safe and Sane Stocks of Petroleum | Aug. 1 | 53 |
| *By H. J. Struth* | | |
| Overproduction Intensified by Increased Efficiency | Aug. 1 | 57 |
| Refinery Expansion Provides Additional Crude Outlet | Aug. 1 | 62 |
| *By George Reid* | | |
| European Trade Barriers | Aug. 1 | 70 |
| *By Roy E. Leigh* | | |
| Expenditures for Drilling Exceed Last Year | Aug. 1 | 151 |
| Richfield Oil Company Awarded Navy Contract | Aug. 1 | 280 |
| Refinery Capacity Expansion Continued During July | Aug. 8 | 38 |
| *By George Reid* | | |
| Fuel Oil and Natural Gas Consumed by Power Plants, Increased in May | Aug. 22 | 56 |
| Natural Gasoline Plants Increased in 1929 | Aug. 22 | 85 |
| Refiners Continue Extensions and Betterments | Sept. 12 | 39 |
| *By George Reid* | | |
| Crude Production Within 21,000 Barrels of Economic Quota | Oct. 3 | 171 |
| Lamont Says Petroleum Industry Can Work Out Its Problems | Oct. 10 | 65 |
| Institute Survey Shows Excess Gasoline Supply | Oct. 17 | 73 |
| Big Reduction of Crude Runs Recommended in Report | Nov. 21 | 23 |
| Petroleum Statistical Situation October 1, 1930, to April 1, 1931, A. P. I. Report | Nov. 21 | 53 |
| Dutch Shell Director Analyzes Producers' Situation | Nov. 28 | 24 |
| Natural Gas Industry Forging Ahead Steadily | Nov. 28 | 46 |
| *By H. J. Struth* | | |
| Demand Slump Outdistances Production Decline | Dec. 5 | 59 |
| Outlet Question Overshadows all Else in Oklahoma-Kansas | Dec. 12 | 67 |
| North Texas Refiners Feeling Slack Demand as Year End Approaches | Dec. 26 | 57 |


## MARKET REVIEWS—FORECASTS


| | | |
|---|---|---|
| California's Excess Production is Below 5000 Feet | Jan. 3 | 26 |
| *By Brad Mills* | | |
| California Decline Removes Market Threat | Jan. 3 | 37 |
| Gray County Pipe Line Runs to be Cut 20 Per Cent | Jan. 3 | 56 |
| Oklahoma City Production at New Peak Despite Bad Weather | Jan. 17 | 50 |
| Oklahoma Operators Expect Price Schedule to be Restored | Jan. 31 | 192 |
| Texas Operators Move to Reduce Output to Market Requirements | Feb. 7 | 33 |
| *By H. H. King* | | |
| Mid-Continent Crude Oil Prices Uniform at Lower Schedule | Feb. 21 | 39 |
| California Crude Gets Increase; Production Takes Big Drop | March 14 | 215 |
| California Prices Up; Production Down; Gas Conservation On | March 21 | 44 |
| *By Brad Mills* | | |
| Crude Price Raise Depends Upon Output Reduction | March 21 | 53 |
| Pipe Lines Taking Less Yates Oil | March 21 | 65 |
| Production Decline Improves Crude Situation | March 28 | 47 |
| Crude Market Substantially Improved in all Sections | March 28 | 56 |
| California and Oklahoma Production Below Current Requirements | April 4 | 41 |
| Early Advance in Crude Prices Seen for Texas and Mid-Continent | April 11 | 28 |
| *By H. H. King* | | |
| Demand Exceeds Production; Higher Crude Prices in Prospect | April 11 | 39 |
| Texas Operators Hold Key to Crude Market | April 18 | 23 |
| *By H. J. Struth* | | |
| Cheap Crude Boosting Demand and Production in Texas | May 2 | 73 |
| Reduced Refinery Runs Complicate Situation | May 2 | 99 |
| Gasoline Weakening Under Burdensome Stocks | May 9 | 41 |
| Refined Market Off Pending More Favorable Weather | May 16 | 51 |
| Production Uptrend Endangers Market Structure | May 23 | 39 |
| Olney Producers Seek Additional Market Outlets | May 23 | 52 |
| Crude Market Outlook Strong in California; Weak in Mid-Continent | June 6 | 41 |
| Humble Reduces Acceptances in North Texas | June 13 | 34 |
| *By H. H. King* | | |
| Critical Areas Stage Production Declines | June 13 | 39 |
| Mixed Trend Prescribed by Crude Price Changes | June 20 | 41 |
| Crude Market Congestion Faces Young County Operators | June 20 | 59 |
| Price of Santa Fe Springs Crude Restored | June 20 | 65 |
| Humble Rescinds North Texas No Purchase Order | June 27 | 25 |
| *By H. H. King* | | |
| Start Oil Through Van Line Early in July | June 27 | 42 |
| Gulf to Enlarge Refinery at Tulsa | June 27 | 66 |
| Shipments Give Gasoline Market Slight Strength | July 4 | 47 |
| Prairie Reduces Crude Purchases 40,000 Barrels Daily | July 11 | 39 |
| Supply-Demand Balance With Easy Grasp | July 11 | 57 |
| Van Becomes Market Factor with Opening of Line | July 11 | 69 |
| Benefits of Lowered Production Offset by Slow Market | July 11 | 82 |
| Committee Finds Texas Demands 736,860 Barrels Daily | July 18 | 41 |
| *By H. J. Struth* | | |
| Reduced Crude Purchases Hurts North Texas District | July 25 | 67 |
| North Texas Gasoline Market Weak | July 25 | 73 |
| Further Decline in Crude Output; Refinery Runs Down | Aug. 1 | 199 |
| Uncertainty in Marketing Conditions Oppresses California Oil Industry | Aug. 1 | 222 |
| Daily Output Declines Despite Increased Potential | Aug. 8 | 71 |
| Price Cutting Preventing Justified Market Improvement | Sept. 5 | 37 |
| *By H. J. Struth* | | |
| Further Decline Aids Statistical Position | Sept. 5 | 48 |
| Attack on Proration Weakens Crude Market | Sept. 12 | 71 |
| California Price Situation Revealed in Open Letter from MacMillan to Standard Oil Company | Sept. 19 | 37 |
| Crude Price Cut Expected Before Market Improves | Sept. 19 | 66 |
| Oklahoma Committee Surveys Crude Demand for Last Quarter | Sept. 19 | 76 |
| California Reduces National Crude Output | Oct. 10 | 165 |
| Texas Fields Daily Potentials Show Continuous Increase | Oct. 10 | 181 |
| New Van Line Secures New Jersey Company Share of Oil | Oct. 17 | 70 |
| Market Confusion Belies Improved Situation | Oct. 24 | 53 |
| Derby Oil Disconnects from 3000 Barrels of Kansas Crude | Oct. 31 | 56 |
| Production Resumes Downward Trend; Market Feeble | Nov. 7 | 91 |
| California Market Weak Despite Heavy Gasoline Consumption | Nov. 7 | 92 |
| North Texas Gasoline Market Follows Crude Prices Down | Nov. 7 | 93 |
| Mid-Continent Refined Market Steady; Needs Crude Stabilization | Nov. 14 | 59 |
| Texas Crude Nominations Will Lower Allowable Output | Nov. 14 | 59 |
| Lower Crude Prices Stop Unnecessary Drilling | Nov. 14 | 69 |
| *By H. J. Struth* | | |
| North Texas Gasoline Market Looking up With Demand | Nov. 14 | 70 |
| Refiners Increase Runs to Stills; Gasoline Stocks Increase | Nov. 21 | 60 |
| California Crude and Refined Markets Both Weak | Nov. 21 | 61 |
| Mid-Continent Gasoline Steady; Jobbers Buying Cautiously | Nov. 21 | 62 |
| North Texas Refiners Persist in Breaking Crude Prices | Nov. 21 | 62 |
| Prairie Withdraws as Purchaser in Texas Panhandle | Nov. 28 | 21 |
| Oklahoma Report Shows Crude Price Average $1.367 | Nov. 28 | 23 |
| Production and Prices Continue to Recede | Nov. 28 | 51 |
| California Gasoline Market Causing Trouble | Nov. 28 | 53 |
| Oklahoma Crude Market Shows Further Weakness | Nov. 28 | 53 |
| Prairie Crude Shipments Make Big Drop and End Is Not Yet | Nov. 28 | 62 |
| Crude and Gasoline Receipts Increased on Atlantic Coast In 1929—Bureau of Mines Report | Nov. 28 | 88 |
| Texas Quarterly Report Shows Crude $1.07 Per Barrel | Dec. 5 | 26 |
| Refinery Runs Now Are at Lowest Point of Year | Dec. 5 | 59 |
| California Crude Market Very Weak; Gasoline Prices Being Shaded | Dec. 5 | 61 |
| Howard-Glasscock Producers Balk at Lower Prices for Crude | Dec. 5 | 64 |
| California Strives to Prevent Market Crisis | Dec. 12 | 27 |
| Increased Crude Purchases Aid North and Central West Texas | Dec. 12 | 69 |
| Barometer Shows Status of Supply and Demand Factors | Dec. 19 | 28 |
| *By H. J. Struth* | | |
| Texas Panhandle Output Cut to Equalize Market | Dec. 19 | 29 |
| *By H. H. King* | | |
| Refinery Runs Show Alarming Gain | Dec. 19 | 55 |
| California Crude Market Stronger with New Plans for Curtailment | Dec. 26 | 44 |


### Price Changes


| | | |
|---|---|---|
| All Texas Crude Prices Slashed | Jan. 17 | 37 |
| Gulf Crude Prices Now Down to New Low Level | Jan. 24 | 58 |
| Crude Oil Price Changes During 1929 and Trend of Posted Prices Since 1918 | Jan. 31 | 64 |
| Review of Crude Price Changes, First Half, 1930 | Aug. 1 | 104 |
| Crude Price Changes | Aug. 8 | 55 |
| Crude Price Changes | Aug. 29 | 88 |
| Industry Confused by California Price Changes | Sept. 19 | 38 |
| Crude Price Changes | Sept. 19 | 70 |
| California Price Cut | Sept. 19 | 87 |
| Crude Price Changes | Sept. 26 | 58 |
| Crude Price Adjustment Forced by Underselling | Oct. 24 | 44 |
| *By H. J. Struth* | | |
| Crude Price Changes | Oct. 24 | 61 |

| | Date | Page |
|---|---|---|
| Texas Panhandle's Average Crude Price Cut Below $1 Per Barrel | Oct. 24 | 69 |
| Crude Price Changes | Oct. 31 | 50 |
| Crude Price Changes | Nov. 7 | 97 |
| Crude Price Changes | Nov. 21 | 65 |
| Crude Price Changes | Dec. 26 | 49 |

## PRODUCTION AND FIELD STATISTICS

| | | |
|---|---|---|
| Sharp Production Gain Marks Turn of New Year | Jan. 10 | 37 |
| Field Work More Productive in December — *By H. J. Struth* | Jan. 10 | 75 |
| Eastern States Output Materially Increased During Year | Jan. 31 | 85 |
| Bureau of Mines Figures to be More Complete | Jan. 31 | 196 |
| Drilling Boosts New Production in January | Feb. 7 | 24 |
| Production at Lowest Point in Year | Feb. 7 | 39 |
| California Potential Test Gives Production Big Boost | Feb. 28 | 39 |
| Oklahoma Quarterly Production Report for Fourth Quarter | Feb. 28 | 107 |
| United States Production Takes Decided Turn Downward | Mar. 7 | 49 |
| Oklahoma and Texas Potentials Boosted in February — *By H. J. Struth* | Mar. 21 | 40 |
| Texas Quarterly Production Report for Fourth Quarter | Mar. 21 | 99 |
| California New Wells Far Behind Last Year | Apr. 4 | 70 |
| California Production Lowest Since Deep Drilling Started | Apr. 11 | 64 |
| Louisiana Drilling Ahead of This Time in 1929 | Apr. 11 | 72 |
| Daily Production 100,000 Barrels in March — *By H. J. Struth* | Apr. 11 | 79 |
| Oklahoma Extends Increased Output | Apr. 18 | 37 |
| California Production Reverses Trend | Apr. 25 | 39 |
| New Production Increased During April | May 9 | 24 |
| Oklahoma Quarterly Production Report for First Quarter, 1930 | May 30 | 94 |
| California Production Nearly Down to Allowable of 596,000 Barrels — *By Brad Mills* | June 6 | 21 |
| Mid-Continent Production in May — *By H. J. Struth* | June 13 | 70 |
| Permits Up 124 for Five Months in Louisiana | June 20 | 112 |
| Tabulation Shows What U. S. Fields Would Do If Opened | July 4 | 33 |
| Operations and Production Show Improvement — *By H. J. Struth* | July 11 | 41 |
| Production at Lowest Point Since December, 1928 | July 25 | 53 |
| Sharp Decline in California Development This Year — *By Brad Mills* | Aug. 1 | 149 |
| Mid-Year Statistical Field Review | Aug. 1 | 164 |
| Field Activity Increased in July; Production Lower — *By H. J. Struth* | Aug. 8 | 36 |
| Crude Production Down 23,000,000 Barrels First Half | Aug. 8 | 40 |
| Monthly Summary of Field Operations | Aug. 8 | 78 |
| Crude Operations Resume Downward Trend | Aug. 15 | 37 |
| Oklahoma Quarterly Production Summary | Aug. 29 | 103 |
| Texas Quarterly Production Summary | Aug. 29 | 107 |
| Panhandle District Shows 4850 Barrels Production Decline | Sept. 12 | 88 |
| California Production Declines to Lowest Figure in Years | Oct. 3 | 192 |
| 1930 Oil Production off 44 Million Barrels Preliminary Figures Show — *By Valentin R. Garfias* | Oct. 10 | 64 |
| September Field Developments Show Sharp Decline | Oct. 10 | 193 |
| California's New Well Total Will Exceed Early Estimates | Oct. 24 | 80 |
| Crude Production Shows Slight Upward Trend | Oct. 31 | 45 |
| Bureau of Mines Figures Reveal Improvement in August | Oct. 31 | 49 |
| Oklahoma and Texas Declines Cause Production Loss | Nov. 7 | 91 |
| Oil Well Completions and Production Lower in October — *By H. J. Struth* | Nov. 7 | 124 |
| Production at Playa del Rey Increases to 35,000 Barrels | Nov. 14 | 83 |
| Average Production of Sabine Parish Now 8685 Barrels | Nov. 14 | 87 |
| Texas Production Continues Downward Trend | Nov. 21 | 59 |
| California's New Well Total for 1930 Far Short of 1929 Record | Nov. 21 | 90 |
| California Production 279,000 Barrels Below Last Year | Nov. 28 | 51 |
| Oklahoma Quarterly Production Report for Third Quarter—1930 | Nov. 28 | 108 |
| Texas Quarterly Production Summary for Third Quarter—1930 | Dec. 5 | 107 |
| Drilling Boosted Potentials in November | Dec. 12 | 83 |
| Summary of Field Operations for November, 1930 | Dec. 12 | 85 |
| California Over-Production at Serious Stage | Dec. 19 | 51 |
| Production Down in All Major Fields | Dec. 26 | 43 |
| Decline in Drilling Offset by Large Potential | Dec. 26 | 45 |
| Crude Production in 1930 Off 111,000,000 Barrels | Dec. 26 | 47 |

## STOCKS AND STORAGE

| | | |
|---|---|---|
| Storage Capacities for Petroleum and Petroleum Products on Pacific Coast, Sept. 1, 1929 — *By E. T. Knudsen* | Jan. 10 | 64 |
| California Halts Tank Building Although Practically All Storage Is Full | Mar. 14 | 63 |
| North Texas Storage Capacity Exceds 30 Million Barrels | Mar. 14 | 72 |
| West Texas Has 19,500,000 Barrels Empty Space | Mar. 14 | 73 |
| Curtailment Tendency Halts Tank Building in Mid-Continent — *By Warren Baker* | Mar. 14 | 90 |
| California Storage Building Slow Despite Increasing Output — *By Brad Mills* | Mar. 14 | 95 |
| Magnolia Depletes Storage in Oklahoma | Mar. 21 | 96 |
| Oklahoma Storage Situation Warns Against Over-Production — *By H. J. Struth* | May 30 | 21 |
| Houston Building Tanks Near Corpus Christi | June 20 | 64 |
| Magnolia Withdraws 337,680 Barrels From Storage in July | Aug. 22 | 56 |
| Report Shows Improvement in Stock Situation | Sept. 5 | 66 |
| Stock Will Shrink With Present Production and Still Runs | Oct. 17 | 53 |
| September Stock Shows 5 Million Barrels Decline | Nov. 7 | 91 |
| Refinery Curtailment Reducing Gasoline Stocks | Nov. 14 | 60 |
| Gasoline Stocks Decline 731,000 Barrels | Nov. 28 | 52 |
| **Pipe Line Runs** | | |
| Magnolia Runs Increased During December | Jan. 24 | 70 |
| Growing Excess Production Prompts Quick Action in Texas | Feb. 14 | 53 |
| Magnolia Pipe Line Runs Increased in January | Feb. 21 | 86 |
| Magnolia Starts Gasoline Through Pipe Line | May 23 | 82 |
| Magnolia Pipe Line Runs Show Increase in April | May 30 | 71 |
| Magnolia Line Movement in June Increases Over May | July 18 | 62 |
| Laredo Pipe Line Runs Total 422,120 Barrels in August | Sept. 26 | 73 |
| Movement From West Texas Increases | Dec. 12 | 56 |


# Features—Editorials—News

## EDITORIALS


| | | |
|---|---|---|
| The Price Cut — *By R. L. Dudley* | Jan. 24 | 35 |
| Will It Be Barrels or Dollars — *By J. Kent Ridley* | Jan. 31 | 45 |
| As Editors See Us — *By Grady Triplett* | Feb. 28 | 66 |
| A Gasoline Tariff? — *By R. L. Dudley* | July 18 | 37 |
| Shall Panic Destroy the Effect of a Good Statistical Position? | Sept. 5 | 40 |
| Mr. Executive Send Your Men to the Exposition, It Means Money to You | Sept. 26 | 34 |
| Why Prairies Predicament—An Association of Rumors — *By Grady Triplett* | Dec. 12 | 23 |


## SPECIAL FEATURES


| | | |
|---|---|---|
| The Billion Barrel Pool — *By James H. Gardner* | Feb. 21 | 30 |
| Navy Now Fuels Ships in Motion—Result of Airplane Experiment — *By G. H. Spencer* | Mar. 14 | 88 |
| Questions and Answers | April 25 | 37 and 72 |
| Questions and Answers | May 2 | 62 and 146 |
| Beyond the Range of the Gas Mains — *By B. V. Ellsey* | May 2 | 44 |
| Questions and Answers | May 23 | 95 and 112 |
| Plan Plant to Separate Oil from "Ice Cream" Gas | May 30 | 51 |
| Questions and Answers | May 30 | 64 and 76 |
| Where Skeeter Chasers Become Necessary Equipment — *By George W. H. Reid* | June 20 | 108 |
| Skelly Oil Company Installs Largest Field Map Ever Made | June 27 | 30 |
| Site of First American Oil Well Found — *By W. M. McGrew* | June 27 | 36 |
| Donart Club Opens Trout Fishing Season | July 4 | 59 |
| Boy Acts Human Fishing Tool to Recover Lost Bit | July 25 | 69 |
| Memorials — *By Harry Botsford* | Aug. 22 | 52 |
| "Ever Used a Japanese Devil Pole?" | Sept. 19 | 94 |
| Alarm Device Lets Pumper Sleep Unless Things Go Wrong | Oct. 17 | 30 |
| Phillip Messenger Speaks Spanish with an English Accent | Dec. 19 | 46 |


## GENERAL NEWS


| | | |
|---|---|---|
| High Royalties Discourage Leasing of Texas University Lands | Jan. 3 | 33 |
| Leigh Starts Second Leg of World-Wide Oil Survey | Jan. 31 | 66 |
| Drill for Carbon Dioxide in Utah | Jan. 31 | 206 |
| Bids Asked on Kettleman Hills Royalty | Feb. 7 | 55 |
| Texas University Board States Position on Royalty | Mar. 7 | 75 |
| Interview With Sir Henri Deterding — *By Roy Leigh* | Mar. 14 | 56 |
| Shippers Loading Allowance Rejected by Commission at Tulsa | April 11 | 76 |

| | Date | Page |
|---|---|---|
| Natural Gas Developments on the Pacific Coast *By W. S. Gard* | May 9 | 34 |
| Seek to Quit Title on Government Permit Land | June 20 | 60 |
| Added Funds Provided for Recovery of Oil Leases | June 20 | 80 |
| Humble Engineers Field Trip | Sept. 12 | 69 |
| Planning Historical Oil Display at World's Fair | Sept. 12 | 117 |
| Swanson Made Chief Economist of Bureau of Mines Division | Sept. 19 | 81 |
| Kelley's Charge Declared to Be Without Merit or Substance | Oct. 31 | 42 |
| Texas A. & M. Petroleum Society Elects Officers for the Year | Nov. 14 | 78 |
| Rycade Oil Corporation Quitting as Operating Unit | Nov. 14 | 82 |
| Texas Deputy Supervisors Have New Territories Assigned | Dec. 19 | 90 |
| Embargo on Oil Imports Proposed in Resolution | Dec. 26 | 59 |
| Four Evening Classes Formed at U. of So. California | Dec. 26 | 65 |


## FINANCIAL


| | Date | Page |
|---|---|---|
| Pan-American and Indiana Officials Inspect Caribbean Properties | Jan. 17 | 40 |
| Sinclair Party Inspects Rio Grande Properties | Jan. 17 | 55 |
| Foster Petroleum Taken Over by Doherty | Feb. 7 | 55 |
| Humble Earnings in 1929 Reach $32,000,000 | Feb. 14 | 66 |
| Moody-Seagraves Center of Plan for Large Natural Gas Merger | Mar. 21 | 73 |
| The Texas Corporation Net Profits Show Gain | Mar. 21 | 74 |
| Magnolia Sells Natural Gas Units to New Utility Combine | April 4 | 53 |
| Seagraves Reviews Gas Merger Advantages | April 11 | 42 |
| Standard of California Earned $3.70 per Share | April 11 | 54 |
| Union Oil Earns 61 cents in First Quarter | April 18 | 63 |
| Sinclair Consolidated Adds 10,000,000 Shares | April 25 | 76 |
| Philips Petroleum Forms Natural Gas Subsidiary | May 23 | 59 |
| Pierce Petroleum Bought by Sinclair Consolidated | May 23 | 59 |
| Ohio Gains Rank in Texas by Transcontinental Merger | June 20 | 54 |
| Oil Profits in 1929 Increase 16.2 per cent *By H. J. Struth* | June 20 | 76 |
| Houston Subsidiary Gets Capital Increase | June 27 | 63 |
| Cities Service Entering California in Big Way | July 4 | 76 |
| Northern Texas Utilities Bought by United Gas | July 11 | 112 |
| Standard-Sinclair Deal Involves $72,000,000 Cash | July 25 | 32 |
| Landreth Sells Half of Hobbs Holdings to Texas Utility | July 25 | 71 |
| Phillips Earnings for First Half | Aug. 1 | 202 |
| Formation of Ten Major Oil Companies Imminent *By Grady Triplett* | Aug. 8 | 25 |
| Kessler Oil Company Buys Oklahoma Properties | Aug. 15 | 53 |
| Andrews County Wildcat Acreage in Deal; May Be Next New West Texas Field | Aug. 22 | 68 |
| Phillips Interests Merged | Sept. 5 | 42 |
| Phillips-Independent Stock Exchanged on 76 to 100 Basis | Sept. 12 | 69 |
| Tidal Buys Landreth's Tank Farm and Other Properties At McCamey | Sept. 12 | 69 |
| Purchase of Loreco by Cities Service Neither Denied or Affirmed | Sept. 12 | 97 |
| Transfer of Oil Well Supply Assets Await Approval | Sept. 19 | 78 |
| Cosden Receivership Further Depresses Oil Stocks | Nov. 14 | 73 |
| Empire Lease and Royalty Buys Half Interest in Miley Production | Nov. 14 | 78 |
| Oil Company Earnings Reflect Depressions | Nov. 21 | 64 |
| Humble Declares Extra 50 Cents with Quarterly Dividend | Nov. 28 | 24 |
| Union Oil Company Renews Move to Acquire Richfield | Nov. 28 | 80 |
| Standard Oil Dividends are $17,000,000 Above Last Lear | Dec. 5 | 75 |
| National Supply Company's Profits Good Despite Curtailment | Dec. 5 | 83 |
| Oil Export Values Slump 30 Million Dollars | Dec. 12 | 90 |
| Skelly Declares Regular $1.50 Quarterly Dividend | Dec. 19 | 74 |
| Rival Gas Companies Seek Wyoming Franchise | Dec. 19 | 78 |
| Stanolind to Take Over Midwest, Dixie and McMan Companies | Dec. 26 | 54 |
| Standard of California Buys Bynum Leases | Dec. 26 | 61 |


## LAW AND LEGISLATION

(Also see Curtailment, Proration, Conservation, and Cooperation).


| | Date | Page |
|---|---|---|
| New Mexican Court Holds Oil Lease Ruling Invalid *By Ladd Haystead* | Jan. 3 | 32 |
| Fort Worth Delegation to Austin Seeks Pipe Line Law Changes | Feb. 28 | 52 |
| Drastic Change in Pipe Line Laws Before Texas Legislature | Mar. 7 | 21 |
| Texas Pipe Line Law Waiting Governor's Signature | Mar. 14 | 225 |
| Lawyers Disagree on Effect of Texas Pipe Line Law | Mar. 21 | 51 |
| Mississippi Law Regulates Well Drilling | April 4 | 78 |
| Cooperation Offered State for Pipe Line Law Enforcement | June 6 | 57 |
| Committee Representatives Confer on Pipe Line Law | June 13 | 61 |
| Texas Pipe Line Law Data Comes in Slowly | June 27 | 58 |
| Texas Pipe Line Law Gets Initial Application at Darst Creek | July 4 | 43 |
| Louisiana Would Tax Natural Gas | July 11 | 73 |
| Court Upholds University Land Lease Sales | July 18 | 70 |
| Wilbur Pleased With Kettleman Hills Legislation | July 18 | 78 |
| Superior Oil Involved in Series of Legal Actions | Aug. 8 | 62 |
| Wilbur Says Kettleman Hills Leases Will Be Extended | Aug. 8 | 71 |
| Discuss New Pipe Line Law at Dallas Meeting | June 13 | 57 |
| Van Operators Threatened With Tax on Royalty Properties | Sept. 26 | 69 |
| Hearing on Oil Investigation to Be Held Oct. 31 | Oct. 10 | 168 |
| Oklahoma City Gas Franchise Renewed in Election | Nov. 28 | 80 |
| Wilbur Says Industry Not Hurt by Withholding Government Lands | Dec. 5 | 26 |
| Railroads' Pipe Line Proposal Draws Reeser Comment | Dec. 19 | 62 |


### Personnel and Safety


| | Date | Page |
|---|---|---|
| Shell Reduces Industrial Accidents by 20 Per Cent | Jan. 24 | 31 |
| World's Safety Record Set by Comar Oil Company | Feb. 28 | 52 |
| Hanlon Heads La.-Ark. Safety Unit | April 11 | 80 |
| Safety Study to Be Part of Petroleum Course | July 11 | 112 |
| Two Important Safety Meetings to Be Held July 30 in Houston | July 25 | 71 |
| Sinclair Safety Winners Save Life of an Infant They Never Saw | July 25 | 82 |
| Gulf Coast Safety Chapter to Meet in Houston | Sept. 5 | 59 |


# Field Development and Exploration

**Also see Curtailment—Proration, page 3, and Economics—Crude Markets—Statistic, page 7, also Maps, page 18.**

## FOREIGN

### General


| | Date | Page |
|---|---|---|
| Living Conditions in South American Oil Felds *By Roy E. Leigh* | Jan. 3 | 29 |
| Tendency Is Toward Europeanization of South American Oil Operations *By Roy E. Leigh* | Jan. 10 | 24 |
| South America Establishes New Production Record *By Roy E. Leigh* | Jan. 31 | 99 |
| Latin America's Oil Resources Total 13,805 Million Barrels | April 11 | 76 |
| Building Boom Follows Oil Development in South America *By Roy E. Leigh* | May 2 | 66 |
| French Parliament Studies Over Government Oil Monopoly | June 6 | 78 |
| Royal Dutch Annual Report Reviews World Conditions | June 20 | 30 |
| Sanitary Precautions Improve Health Conditions at Tropical Camps | June 27 | 34 |
| European Survey *By Roy E. Leigh* | Aug. 1 | 68 |


### Albania


| | Date | Page |
|---|---|---|
| Prospecting and Drilling | Nov. 21 | 46 |


### Argentina


| | Date | Page |
|---|---|---|
| "Institute of Oil" Created in Argentina | May 3 | 36 |
| Annual Production for 1929 | June 27 | 74 |
| Coal-Bearing Land to Be Exploited for Oil | June 27 | 74 |
| Drilling Activities Show Decline | July 11 | 54 |
| Crude Production for First Six Months Shows Decline | July 11 | 54 |
| Dutch Shell Subsidiary Will Build Refinery in Argentina | July 11 | 53 |
| Work Resumed on Shell Refinery | Oct. 24 | 44 |
| Survey of Drilling Operations | Oct. 24 | 44 |
| Government Shake-up Discloses Friendliness | Nov. 7 | 89 |
| New Oil Policy Outlined | Dec. 26 | 32 |


### Australia


| | Date | Page |
|---|---|---|
| Geological Surveys Create Interest in Drilling in Wooramel District | May 30 | 36 |
| Recover Large Amount of Oil in Lakes Entrance Text | July 11 | 42 |
| Springsure District Reports Show Possibilities of Production in That Area | July 11 | 42 |
| Search for Oil in New Guinea National Affair | Sept. 19 | 65 |
| Gas Seepages Discovered | Sept. 19 | 65 |
| Australian Prospects Cover Large Area | Nov. 7 | 89 |
| Producers Association Formed | Nov. 21 | 46 |
| Australian Wildcat Drilling | Dec. 5 | 51 |
| New Tests for Waitangi | Dec. 5 | 51 |
| Well Blowout at North Island | Dec. 26 | 33 |


### Austria


| | Date | Page |
|---|---|---|
| Austrian Test Proves Failure | Oct. 17 | 41 |


### Belgium


| | Date | Page |
|---|---|---|
| Motor Fuels Congress Meets in Brussels | May 30 | 36 |
| Increased Demand for Gasoline | June 27 | 74 |


### Bolivia


| | Date | Page |
|---|---|---|
| Bolivia's Organic Petroleum Law Up for Passage in August | May 2 | 108 |
| Exploration in Cochabamba | Dec. 26 | 32 |

| | Date | Page |
|---|---|---|
| **Borneo** | | |
| Gulf Oil Corporation Forms New Subsidiary to Operate In Borneo | June 6 | 36 |
| **Brazil** | | |
| Test Begun Near Sao Paolo | May 30 | 36 |
| Formation of New Company for Drilling Planned | Aug. 15 | 32 |
| **British Guiana** | | |
| Exploration Under Consideration in British Guiana | July 4 | 39 |
| **British South Africa** | | |
| Wildcat Test Shows Favorable Core Tests | June 6 | 36 |
| Sinclair Consolidated Pushes Operations in West Africa | July 11 | 53 |
| Beaufort Beds Located in Cape Province | Aug. 29 | 64 |
| **Canada** | | |
| Canadian Annual Report Shows Production Up | June 20 | 61 |
| Drilling Operations in Ontario | July 4 | 39 |
| New Gas Well in Turner Valley Field | July 4 | 39 |
| Pipe Line Proposed From Turner Valley to Winnipeg | July 4 | 39 |
| Activity Brings New Investments | Nov. 21 | 46 |
| Record Production for August | Dec. 19 | 46 |
| Nova Scotia Drilling Operations | Dec. 19 | 46 |
| September Production High Record | Dec. 26 | 33 |
| **Canal Zone** | | |
| Gulf Oil Corporation Abandons Attempt to Locate Production in Panama | Aug. 29 | 64 |
| **China** | | |
| Chinese Geological Society | Dec. 19 | 48 |
| **Chile** | | |
| Economic Report Issued | July 4 | 39 |
| Government Controlled Operations | Dec. 5 | 51 |
| **Colombia** | | |
| Infantas and La Cira Fields Models of Development<br>*By Roy E. Leigh* | Jan. 17 | 23 |
| Colombian Oil Legislation Change Again Deferred—Foreign Companies Withdraw<br>*By Roy E. Leigh* | Jan. 24 | 21 |
| Infantas Field Development Remarkably Successful<br>*By Roy E. Leigh* | Feb. 14 | 37 |
| French Get Oil Grant in Colombia | Mar. 21 | 95 |
| Oil Occurrence Noted in Uraba | July 11 | 54 |
| Exports for First Six Months Show Decrease | Sept. 19 | 65 |
| Oil Law Being Prepared | Oct. 17 | 40 |
| Petroleum Law Conference | Oct. 31 | 39 |
| Government Takes Bonds | Dec. 19 | 46 |
| **Cuba** | | |
| Significance of New Oil Well in Cuba<br>*By Chas. E. Coulter* | Apr. 25 | 29 |
| Asphalt Production in Cuba | June 27 | 74 |
| Amendments to Mining Laws | Sept. 5 | 65 |
| **Czechoslovakia** | | |
| Production Increased Over 100 Per Cent During First Six Months of 1930 | Sept. 19 | 65 |
| **East Indies** | | |
| Bull-Dog Tenacity Has Won East Indies Petroleum Battle<br>*By King Hamilton Grayson and W. M. Rosser* | June 13 | 31 |
| **Egypt** | | |
| Petroleum Basin Opened at Suez | Oct. 17 | 40 |
| Egyptian Production for 1929 | Oct. 3 | 167 |
| Egyptian Petroleum Situation | Dec. 19 | 48 |
| **England** | | |
| British Companies Plan Active Campaigns in Falcon<br>*By Roy E. Leigh* | Feb. 28 | 26 |
| Royal Dutch Shell Acquires European Companies | May 30 | 36 |
| Circular Advises No Licenses to be Granted | June 6 | 36 |
| Weise Method Used to Find Oil | June 27 | 74 |
| Anglo-Egyptian Meeting Discloses Company's Financial Standing | June 27 | 74 |
| Sipara Trinidad Oilfields Formed | July 4 | 39 |
| Shell Extends Holdings in European Countries | July 4 | 39 |
| Refining in England and Scotland Enjoying Rapid Growth | July 4 | 39 |
| Custom and Tradition Halt English Drilling | Aug. 1 | 72 |
| **France** | | |
| Cities Service Establishes Headquarters in Paris | June 6 | 36 |
| Petroleum Imports Show Increase | June 27 | 74 |
| New Petroleum Port Being Constructed | June 27 | 74 |
| Pipe Line Company Organized | Nov. 7 | 89 |
| Begin Construction of Refineries | Nov. 7 | 89 |
| Sources of Production | Dec. 5 | 51 |
| **Germany** | | |
| American Group Enters German Oil Fields<br>*By Roy E. Leigh* | April 25 | 26 |
| Extent and Value of German Petroleum Deposits Unknown<br>*By Roy E. Leigh* | May 23 | 23 |
| Secrecy Keeps German Operating Advances Largely Individual | Aug. 1 | 106 |
| Survey Establishes Number Drilling Rigs in Germany | Sept. 5 | 65 |
| Refinery Production for First Six Months | Sept. 19 | 65 |
| Hademstorf Strike Opens New Field | Oct. 17 | 41 |
| Neinhagen Field Gets 7500 Barrel Producer | Oct. 24 | 45 |
| Prolific German Well | Oct. 31 | 39 |
| Prospecting Will Begin Soon | Nov. 7 | 89 |
| Prussian Acquisition of Oil Tract | Dec. 5 | 51 |
| Acquisition of Oil Lands | Dec. 19 | 46 |
| Increased Production Seen for 1930 | Dec. 26 | 33 |
| **Iraq** | | |
| Iraq Pipe Line Agreement | Oct. 31 | 39 |
| Oil Men Conquer the "Messpot"<br>*By Roy E. Leigh* | Oct. 24 | 25 |
| In Iraq<br>*By Roy E. Leigh* | Oct. 31 | 26 |
| **Italy** | | |
| Italian Company Formed for Exploitation of Oil Concessions | June 27 | 74 |
| Petroleum Prospecting Appropriations | Dec. 19 | 46 |
| **Japan** | | |
| Japanese Dutch Oil Company Formed | June 6 | 36 |
| Sakhalin Showings Being Developed | July 4 | 39 |
| Japanese Petroleum Resources | Nov. 21 | 46 |
| **Mexico** | | |
| Sinclair to Extend Developments in Mexico | May 30 | 36 |
| National Petroleum Investigating Committee Named by President Rubio | May 30 | 36 |
| Exportation of Crude During 1929 | June 6 | 36 |
| Mexican Eagle to Build Refinery at Mexico City | July 11 | 53 |
| Heavy Taxes Prove Drawback to Operations | July 11 | 53 |
| Tamaulipas Well Flows 1000 Barrels Daily | Aug. 15 | 32 |
| August Production Estimates | Oct. 31 | 39 |
| Nine Producers in Nuevo Leon | Nov. 7 | 89 |
| Unitization Plan Adopted | Nov. 21 | 46 |
| Field Operations in Vera Cruz | Dec. 5 | 51 |
| Drilling Campaign to Start | Dec. 5 | 52 |
| Mexico's Future Petroleum Possibilities<br>*By Jack Logan* | Nov. 28 | 26 |
| An Interview With Jose Benitez—Governor of Nuevo Leon<br>*By Jack Logan* | Nov. 28 | 27 |
| Mexico's Future Petroleum Possibilities—Nuevo Leon and Tamaulipas Have Many Prospective Oil Structures<br>*By Jack Logan* | Dec. 5 | 27 |
| Mexico's Future Petroleum Possibilities—Glenrose Lime Promises Petroleum Production in Coahuila<br>*By Jack Logan* | Dec. 12 | 31 |
| Mexico's Future Petroleum Possibilities—Petroleum Laws, Economics, and Operating Costs<br>*By Jack Logan* | Dec. 19 | 37 |
| Mexico's Future Petroleum Possibilities—Monterrey—New Oil Metropolis of Mexico<br>*By Jack Logan* | Dec. 26 | 34 |
| Production and Drilling Operations | Dec. 19 | 48 |
| James L. Tatum Is an Authority on Geology of Mexico | Dec. 26 | 33 |
| **Morocco** | | |
| Mining Research Safety Zones Established | May 30 | 36 |
| Evidences of Petroleum Found in Riffian Hills | Sept. 5 | 65 |
| **Nicaragua** | | |
| Preparations to Drill for Oil In Nicaragua | May 30 | 36 |
| **Norway** | | |
| Petroleum Deposits Reported | Nov. 21 | 46 |
| **Persia** | | |
| Discovery of Oil Deposits | Dec. 19 | 48 |
| **Peru** | | |
| International Petroleum Corporation Shows Increased Production for First Seven Months | Oct. 17 | 41 |
| **Poland** | | |
| Poland's Petroleum Industry Losing Importance<br>*By T. S. Szwabowicz* | Jan. 3 | 23 |
| Yearly Production Statistics | May 30 | 36 |
| Crude Production for 1929 | July 4 | 39 |
| Polish Operators Join Forces for Wildcat Prospecting<br>*By Roy E. Leigh* | Aug. 1 | 94 |
| Galician Area Tested Only in Spots | Aug. 1 | 95 |
| Polish Oil Industry Not Asleep | Aug. 1 | 99 |
| Reports of Operations for First Six Months | Oct. 24 | 44 |
| March Crude Production | May 30 | 36 |
| Over-Production May Result in Curtailment Measures | July 11 | 53 |
| Exports for First Quarter Show Increase | July 11 | 53 |
| Roumania Proposes Curtailment of Production | Aug. 1 | 71 |
| Astra-Romana's Operations Show Mark of Internationalism<br>*By Roy E. Leigh* | Aug. 15 | 28 |
| Reports of Drilling Activities and Explorations | Sept. 19 | 65 |
| Natural Gas Report | Oct. 17 | 41 |
| Curtailment Measures Cause Decreased Production | Oct. 24 | 44 |
| Curtailment in Roumania | Dec. 5 | 52 |
| Curtailment Program Fails | Dec. 19 | 48 |

| | Date | Page |
|---|---|---|
| Latest Big Zwolle Producing Stops Flowing | June 13 | 66 |
| Development in Concordia Parish Looms | June 20 | 71 |
| Bellevue Well Tests Heavy Flow of Gas | June 27 | 65 |
| Deeper Exploration Attracting Interest at Zwolle | June 27 | 71 |
| Gas Well Completions Feature Week in North Louisiana | July 4 | 78 |
| Hope for Zwolle Production at New Depth | July 11 | 88 |
| Zwolle Drilling Campaign Slows: Wildcat Work Progressing | July 18 | 81 |
| Caddo Parish Test is Disappointing: New Bionville Parish Field Likely | July 25 | 77 |
| North Louisiana's Deepest Oil Well Completed at 5506 | Aug. 8 | 75 |
| Zwolle Now Seventeen Miles of Freakish Producing Territory | Aug. 22 | 78 |
| Bellevue Shallow Field Well Opens Up New Trinity Production | Sept. 5 | 76 |
| North Louisiana's New Upper Trinity Zone Showing Salt Water | Sept. 12 | 96 |
| Zwolle East Extension Well Renews Activity | Sept. 19 | 85 |
| Second Zwolle East Field Extension Well Completed | Oct. 3 | 200 |
| Zwolle Field is Extended Mile South by Largest Well | Oct. 10 | 188 |
| Zwolle is Extended Two Miles Further Southeast | Oct. 17 | 79 |
| Two Tests Below Blossom Hold Promise at Zwolle | Nov. 7 | 120 |
| Zwolle Field is Extended One Mile Southeast | Nov. 21 | 92 |
| Zwolle East Field Extended Quarter Mile Southwest | Nov. 28 | 85 |
| Out-of-State Operators are Attracted to Louisiana | Dec. 5 | 85 |
| Zwolle Well Connects Two Southern Extensions | Dec. 5 | 85 |
| Zwolle has Seven Locations; Extension Test Spraying | Dec. 12 | 79 |
| Holly, De Soto Parish, Gets Large Gas Well | Dec. 12 | 79 |
| Bienville Parish Gets Two Failures During Week | Dec. 12 | 80 |
| Urbana District Records Good Oil Well at 3532 Feet | Dec. 19 | 87 |
| New Drilling Activity Declines in North Louisiana | Dec. 19 | 87 |
| Two Link Wells Hold Interest in Zwolle | Dec. 26 | 64 |
| Claiborne Parish Test to Go to 5000 Feet | Dec. 26 | 64 |
| **Louisiana Gulf Coast** | | |
| (Also see Texas Gulf Coast) | | |
| Caillon Island First New Field in 1930 | Jan. 3 | 202 |
| Bayou Bouillon Production Gets Westward Extension | March 21 | 69 |
| Evangeline Test Sets New Depth Record for Gulf Coast | June 27 | 61 |
| Complete Five Producers in Vinton Field | Aug. 1 | 218 |
| Pure Oil Plans Ultra Deep Test for Sweet Lake Field | Oct. 17 | 71 |
| Inactivity Marks Operations in South Louisiana | Oct. 31 | 63 |
| Shell has 1050 Barrels Daily in White Castle Field | Nov. 7 | 119 |
| Black Bayou Dome Now has Five Producing Wells | Nov. 7 | 119 |
| Vacuum Makes Locations for Iowa Salt Dome Test | Nov. 14 | 81 |
| Three Completions Recorded at East Hackberry | Nov. 28 | 82 |
| Ten Completions Recorded in Louisiana Gulf Coast | Nov. 28 | 83 |
| East Hackberry has Two Wells Completed for 1512 Barrels | Dec. 5 | 84 |
| Two Completions Recorded in Jennings Field | Dec. 19 | 88 |
| **MICHIGAN** | | |
| Muskegon Field Shows Rapid Decline in Both Oil and Gas | Jan. 10 | 26 |
| **MISSISSIPPI** | | |
| Gulf Makes Location for Test in Mississippi | Feb. 7 | 58 |
| Mississippi Tests Report Satisfactory Progress | March 7 | 69 |
| Satisfactory Progress Being Made in Mississippi Wildcat Tests | March 14 | 237 |
| Mississippi Wildcat Well Flows Salt Water | April 11 | 72 |
| Mississippi Wildcat Well Plugged Back for Gas | April 18 | 72 |
| Mississippi Wildcat Test Drilled Deeper | April 25 | 90 |
| Mississippi Drilling Operations on Increase | May 2 | 104 |
| Third and Largest Gas Well Completed in Jackson Area | May 16 | 95 |
| Two New Locations Made in Mississippi | May 23 | 54 |
| Jackson Area Suffers Setbacks During Past Week | May 30 | 62 |
| High Water Interferes in Mississippi Development | June 6 | 90 |
| Jackson Operations Center in Neshola County Area | June 13 | 62 |
| Plan Test of Area 20 Miles North of Jackson | June 20 | 71 |
| Mississippi Again Active with 11 Tests Drilling | June 27 | 72 |
| Core Drilling on Jackson Anticline | June 27 | 86 |
| Second Commercial Gas Well Completed at Jackson | July 11 | 90 |
| Mississippi Area Gets Three Gas Wells, Two Big Ones | July 18 | 81 |
| Mississippi New Drilling on Increase | July 25 | 78 |
| Drilling Spreading to States East of Mississippi<br>*By W. W. Moore* | Aug. 1 | 153 |
| Four New Locations Announced for Tests in Mississippi Gas Area | Aug. 22 | 70 |
| Wild Gas Well in Jackson City Limits Kills Workman | Aug. 29 | 78 |
| Jackson Wild Gas Well Under Control; Four Locations Made | Sept. 5 | 78 |
| Jackson Gas Area Extended One-Fourth Mile Southeast | Sept. 19 | 84 |
| Jackson Gas Field Gets 30,000,000 Foot Well | Sept. 26 | 77 |
| Jackson Gas Well May Gauge 30 Million Feet to One Hundred Million Feet of Gas | Oct. 3 | 202 |
| Rankin County Gas Well is Jackson Field's Eighteenth | Oct. 17 | 80 |
| Oil Show in Jackson Well Renews Interest in Area | Oct. 24 | 78 |
| Oil Show in Jackson Well of no Commercial Value | Oct. 21 | 64 |
| Await with Interest Test Northeast of Jackson Area | Nov. 14 | 88 |
| Jackson Field Adds 8,000,000 Foot Well | Nov. 21 | 92 |
| Rankin County Test Promises Large Gas Production | Nov. 28 | 85 |
| Jackson Gas Field Adds Two More Producers | Dec. 5 | 88 |
| Two New Gas Wells Brought in for Jackson Area | Dec. 12 | 80 |
| Jackson Gas Field Year Old has 27 Producers | Dec. 26 | 29 |
| Jackson Adds Large New Gas Well During Week | Dec. 26 | 65 |
| **MONTANA** | | |
| International Oil Field is Due Extensive Drilling | Feb. 21 | 66 |
| Red Coulee Well Makes Favorable Showing | April 4 | 74 |
| New Canadian Border Field Extended Mile | April 11 | 74 |
| Border Field Extended Three Miles | July 11 | 80 |
| Amsells Structure is Proven for Gas Production | Dec. 19 | 78 |
| **NEBRASKA** | | |
| Nebraska Still Hopes for Oil and Gas Production | Jan. 31 | 210 |
| Nebraska's Wildcat Activity Depends on Present Tests | June 13 | 65 |
| **NEW MEXICO** | | |
| Output of New Mexico Pumpers Nears Line Requirements | Jan. 3 | 57 |
| Lea County Well at Lower Depth Opens More Territory | Jan. 10 | 56 |
| Lea Field Producing Wells Increased to Six | Jan. 17 | 55 |
| Hobbs Extension Producers Make New Record for New Mexico | Jan. 31 | 195 |
| Limiting Runs to Reduce Output of Lea Field, New Mexico | Feb. 7 | 54 |
| Lea County Production Reached New High in January | Feb. 21 | 59 |
| Second Producer Completed in New Pool in Lea County | March 7 | 65 |
| Hobbs Field has Ample Line Outlet in Prospect | April 4 | 58 |
| Real Drilling Campaign Getting Under Way in Hobbs Field | April 11 | 53 |
| Hobbs Locations Being Extended Along Long Narrow Strip | April 18 | 57 |
| Purchasers Seek Contracts for New Mexico Production | April 25 | 53 |
| New Tests Follow Rail and Pipe Line Connections in Hobbs Area | May 9 | 58 |
| Line Outlet Makes Hobbs Field Potential Market Threat | May 16 | 70 |
| New Mexico Forcing More West Texas Restriction<br>*By H. H. King* | May 23 | 35 |
| Drilling Activity at Hobbs After Opening of Outlets | May 23 | 52 |
| Hobbs Field Draws Interest as Drilling Activity Increases | June 6 | 26 |
| Hobbs Possibilities as Market Threat Due for Early Shutdown | June 6 | 64 |
| Difficult Drilling Conditions Makes Cost High at Hobbs | June 6 | 72 |
| Expect Big Production from Shell Test in Hobbs Field | June 13 | 56 |
| Hobbs Production Possibilities Proven by Important Completions | June 20 | 36 |
| Hobbs Develops Big Production, No Curtailment Planned | June 27 | 28 |
| Atlantic's New Mexico Line Nearing Completion | June 27 | 29 |
| Development at Hobbs Now Going Forward Steadily | July 25 | 44 |
| Gauge Through Tubing Reduces Hobbs Potential | Aug. 1 | 212 |
| Hobbs Operators Seek Re-gauging of Wells on Open Flow Basis | Aug. 8 | 43 |
| Drilling Activity at Hobbs Approaching Peak Level | Aug. 15 | 54 |
| Completion of Good Wells Boosts Hobbs Potential | Aug. 22 | 71 |
| Hobbs Potential Production up 100,000 Barrels | Aug. 29 | 82 |
| Hobbs Production Area Extended One-half Mile Northwest | Sept. 5 | 84 |
| Hobbs Proving "Shoe-string" Type of Oil Field<br>*By H. H. King* | Sept. 12 | 43 |
| Hobbs Potential Near 500,000 Barrel Mark | Sept. 19 | 81 |
| Six New Locations Announced for Hobbs Area | Sept. 26 | 71 |
| Hobbs Field Potential Now 526,000 Barrels Daily | Sept. 26 | 71 |
| 14 Hobbs Wells Add 16,000 Barrels Potential Daily | Oct. 3 | 165 |
| New Drilling at Hobbs Cut to Minimum in Past Week | Oct. 10 | 181 |
| Hobbs North End Wells Larger Than Anticipated | Oct. 17 | 66 |
| Hobbs Drilling Decline Checked by Orders for Six New Locations | Oct. 31 | 61 |
| New Hobbs Well Nears Record for Field | Nov. 14 | 79 |
| Eight New Wells Boost Hobbs Potential Beyond Million | Nov. 21 | 82 |
| Two Companies Seek Higher Allowances at Hobbs | Dec. 5 | 81 |
| Hobbs Active Drilling Reduced to Eight Wells | Dec. 12 | 72 |
| Wildcat Test Promises Four-mile Extension at Hobbs | Dec. 19 | 78 |
| **OKLAHOMA** | | |
| **Asher-Wannette** | | |
| Asher-Wannette Center of New Interest in Oklahoma | June 20 | 56 |
| Wanette Sand not Definitely Correlated<br>*By Floyd Swindell* | Sept. 5 | 43 |
| Wanette Well's Production is Increased on Deepening | Nov. 21 | 74 |
| **Seminole** | | |
| Harris Pool in Seminole County Active After Completions | Jan. 3 | 52 |
| Newest Seminole Pool Placed on 20 Per Cent Proration | Jan. 17 | 50 |
| Many Inovations Accompany Oil Operations in Seminole Area | June 20 | 74 |

| | Date | Page |
|---|---|---|
| New Seminole Area Producer Makes 1560 Barrels After Shot | Sept. 5 | 56 |
| Test East of Little River Gets Oil at 2654 Feet | Oct. 3 | 184 |
| Carr City Most Promising Area in Greater Seminole | Oct. 10 | 177 |
| Greater Seminole District Active During Past Week | Oct. 31 | 56 |
| Greater Seminole Output Nears Half Million | Nov. 14 | 75 |
| **Earlsboro** | | |
| East Earlsboro Field Attains New Production Peak | Jan. 24 | 52 |
| South Earlsboro Extension Test Flow 250 Barrels Hour | Feb. 14 | 65 |
| New Pimple South of Earlsboro Appears Small but Prolific | Feb. 21 | 56 |
| Opening New Pool Southwest of Earlsboro Seems Likely | May 30 | 57 |
| **Konowa** | | |
| Konowa Pool Promises Extension in Two Directions | Feb. 7 | 52 |
| Konowa Developments Leave Much Yet to Learn About Pool | March 14 | 228 |
| Small Producer Extends Konowa Pool | March 28 | 68 |
| **Oklahoma-City** | | |
| Oklahoma City Area Makes Another Production Record | Jan. 3 | 52 |
| Oklahoma City Curtailment for January Set at 50 Per Cent | Jan. 10 | 40 |
| Oklahoma City Takes Rank as State's Greatest Oil Field | Jan. 10 | 50 |
| *By Warren Baker* | | |
| Water Intrusion Threatens Lime Wells at Oklahoma City | Jan. 10 | 53 |
| Poor Wells at Oklahoma City; Many Wells Due | Jan. 24 | 51 |
| Oklahoma City Pool Gives State New Possibilities | Jan. 31 | 68 |
| *By Warren Baker* | | |
| Water Helps Weather Hold Back Oklahoma City Production | Feb. 7 | 52 |
| Oklahoma City Completions Add Much to Potential of Field | Feb. 14 | 65 |
| Oklahoma City Potential Raised; Lines Approaching Limits | Feb. 21 | 53 |
| Oklahoma City Above Line Capacity | Feb. 28 | 51 |
| Oklahoma City Producing Area Extended to West | March 7 | 61 |
| Allowable Output Cut in Half at Oklahoma City | March 7 | 62 |
| Oklahoma City Field Gets Two Important Extensions | March 14 | 227 |
| Oklahoma City Producing Area Gets Several Extensions | March 21 | 63 |
| Important Tests at Oklahoma City Near Completion | March 28 | 68 |
| Set Long String of Nine-Inch at Oklahoma City | March 28 | 68 |
| Pipe Lines Increase Runs from Oklahoma City | April 4 | 38 |
| Wilcox Sand May be Found in Oklahoma City Well | April 4 | 51 |
| Work Resumed on 147 Wells at Oklahoma City | April 11 | 53 |
| Oklahoma City Meeting to Fix Drilling Regulations | April 18 | 53 |
| Oklahoma City Production Back to Normal | April 18 | 54 |
| Oklahoma City Casing Schedule Fixed | May 2 | 86 |
| Oklahoma City North End Sets Big Well Record | May 22 | 86 |
| Production at Oklahoma City Extended West | May 2 | 86 |
| Development Marks Oklahoma City Great Light Oil Area | May 9 | 53 |
| No Immediate Change in Output at Oklahoma City | May 16 | 64 |
| Oklahoma City Pool May be Extended Northwest | May 23 | 59 |
| Oklahoma City Extended with Town Lot Drilling | May 30 | 57 |
| Oklahoma City Gets Mile Extension | May 30 | 57 |
| Oklahoma City Production Peak at End of May | June 6 | 62 |
| Another Wilcox Sand Well at Oklahoma City | June 13 | 64 |
| Oklahoma City Production Off 17,889 in Past Week | June 20 | 56 |
| Three Water Producers Mark Oklahoma Edge | July 4 | 22 |
| *By Floyd Swindell* | | |
| Oklahoma City's South End Gets Several Large Producers | July 11 | 79 |
| Flow "Under-Produced" Wells Hikes Oklahoma City Output | July 18 | 69 |
| Water Supply at Oklahoma City | July 25 | 36 |
| *By Floyd Swindell* | | |
| Oklahoma City Shut-Down Agreement Extended 12 Days | July 25 | 72 |
| Oklahoma City Field—History—Geology—Mechanics | Aug. 1 | 64 |
| *By Floyd Swindell* | | |
| Oklahoma City Wells Flow One Day in Twelve Under Plan | Aug. 1 | 211 |
| Production Spotted on South End of Oklahoma City | Aug. 8 | 61 |
| Oklahoma City Field Extended to West; New Shut-In Started | Aug. 15 | 53 |
| Three Big Wells Added in North End at Oklahoma City | Aug. 22 | 67 |
| Drilling Campaign in Oklahoma City Field Nearing Climax | Aug. 29 | 73 |
| Oklahoma City has Big Week with 30 Completions | Sept. 5 | 56 |
| Completions Total 98 for Oklahoma City Field in August | Sept. 12 | 85 |
| Drilling at Oklahoma City has Passed Maximum Stage | Sept. 19 | 77 |
| Completions at Oklahoma City Total 150,000 Barrels | Sept. 26 | 67 |
| Oklahoma City Locations and Completions Total 15 Each | Oct. 3 | 185 |
| World's Largest High Gravity Well at Oklahoma City | Oct. 10 | 177 |
| Oklahoma City South Wider Than First Thought | Oct. 17 | 65 |
| Fourteen Wells Completed at Oklahoma City During Week | Oct. 24 | 67 |
| Oklahoma City Production Extended Southwest | Oct. 31 | 56 |
| Extend Oklahoma City Pool Nearly Mile Northwest | Nov. 7 | 107 |
| Oklahoma City's Third Gusher Finally Put Under Control | Nov. 7 | 108 |
| Oklahoma City Production Extended Two Ways | Nov. 14 | 74 |
| Oklahoma City Now has 127 Operations and 643 Wells | Nov. 21 | 74 |
| Oklahoma City Runs 103,000 Barrels Daily | Nov. 28 | 75 |
| Oklahoma City has Produced 40,202,900 Barrels in Two Years | Dec. 5 | 76 |
| Oklahoma City Production Runs Show Loss from Last Week | Dec. 19 | 71 |
| Oklahoma City Adds 8 New Operations as 7 Wells are Completed | Dec. 26 | 56 |
| **Tatums** | | |
| Tatums Pool Most Active in Southern Oklahoma | Aug. 29 | 73 |
| Tatums Pool has Busy Week with Five Completions | Oct. 31 | 57 |
| Tatums Extension Well now Drilling Below 4012 Feet | Nov. 14 | 75 |
| Tatums Pool's Largest Well Completed for 2468 Barrels | Nov. 28 | 76 |
| Limits of Tatums Pool Depend on Five Drilling Wells | Dec. 5 | 77 |
| Tatums Pool Limits Defined in Two Directions, Extended Another | Dec. 19 | 72 |
| **Wewoka** | | |
| Two Wells Near Pay in Wewoka Townsite Area | Dec. 5 | 77 |
| Wewoka Townsite to be Center of Development Work | Dec. 19 | 71 |
| Wewoka Gas Well Fire Extinguished | Dec. 26 | 55 |
| **Wildcats and Miscellaneous** | | |
| Mission Deep Test Showing Oil Drilling Below 5000 Feet | Jan. 3 | 53 |
| Northwest Oklahoma Wildcat Areas Gaining Interest | Feb. 28 | 37 |
| Another Wilcox Sand Pool Promised North Oklahoma | April 25 | 56 |
| Reiter-Foster Well Brought in as Producer at 4737 Feet | April 25 | 57 |
| Deep and Shallow Development Includes Oklahoma's Activity | June 6 | 62 |
| New Depth Yield Oil in South Oklahoma Pools | June 27 | 64 |
| Water Instrusion Removes West Chandler as Market Threat | July 4 | 70 |
| South Oklahoma Pools Have Active Campaigns | July 11 | 79 |
| Two New Producers Added at West Chandler | July 25 | 73 |
| Wildcat West of Seminole Looks Favorable for Producer | Aug. 22 | 68 |
| Completions Made Rapidly in Carter County Area | Oct. 17 | 65 |
| Carr City Well Estimated at 1000 Barrels | Nov. 7 | 107 |
| Logan County Wildcat Drilling Ahead in Wilcox Sand | Nov. 21 | 74 |
| Harper County Well Deepest in Oklahoma | Nov. 28 | 76 |
| Wilcox Most Prolific Oil Sand in Oklahoma | Dec. 26 | 65 |
| **SOUTH DAKOTA** | | |
| South Dakota's First Oil Well Makes 25 Barrels | Jan. 10 | 86 |
| South Dakota Wildcat Well Holds Interest | April 18 | 65 |
| Gas Well Expected in South Dakota Test | May 23 | 95 |
| **TEXAS** | | |
| **Texas Panhandle** | | |
| Gray County Proration Plans not Fully Realized | Jan. 10 | 55 |
| Moore County Producer Declines Rapidly When Water Intrudes | April 18 | 56 |
| Gray County Production Nears Outlet Capacity | May 9 | 58 |
| Gray County Production Again Passes 70,000 Barrels | May 16 | 67 |
| Gray County Production at New Peak for Year | June 6 | 55 |
| Panhandle Crude Buyers Reduce Purchases 7000 Barrels | Aug. 1 | 213 |
| Phillips Extends Line to Morton-Reeder Pool | Aug. 1 | 232 |
| Gray County Completions Serve to Complicate Reduction Plans | Aug. 15 | 58 |
| Leck-Daugherty Extension Will Revive Drilling Activity | Aug. 29 | 75 |
| Gray County Operators Build Up Potentials for Proration | Aug. 29 | 76 |
| Panhandle Operators Boost Production to 101,395 Barrels Daily | Sept. 5 | 60 |
| Gray County Producer Starts Offset Campaign | Sept. 26 | 70 |
| Development of Wildcat Area in Gray County Assured | Oct. 3 | 187 |
| New Gray County Area Gets Thorough Drilling | Oct. 31 | 59 |
| Fifteen Tests Around Sullivan Well Nearing Completion | Nov. 28 | 77 |
| Failures Further Remove Threat of Sullivan Area | Dec. 5 | 89 |
| Complete Another Good Well in Sullivan Area | Dec. 19 | 74 |
| Texas Panhandle Slow in Responding to New Quota | Dec. 26 | 57 |
| **North Central Texas** | | |
| Purchasers Storing Wilbarger Oil for Account Producers | Jan. 3 | 56 |
| No Important New Discoveries in North Central Texas | Jan. 31 | 129 |
| *By H. H. King* | | |
| Three Wildcat Strikes in Three Counties in North Texas | Feb. 14 | 68 |
| Swastika Expansion Starts Drilling Campaign | April 11 | 56 |
| Young County Producer Best in North Texas in Five Years | April 18 | 55 |
| Drilling Rush Underway in Graham Field | May 2 | 90 |
| New Finley-Brown Wells Boost Brown County | May 2 | 90 |

| | Date | Page |
|---|---|---|
| Finley-Brown Field Sends Output Upward | May 30 | 49 |
| Four Tests Fail in Search for Big Young County Production | June 13 | 57 |
| Callahan County Wildcat Flowing by Heads | June 20 | 60 |
| Finley-Brown Field has 4840 Barrel Decline | June 20 | 60 |
| Finley-Brown Outpost Well Makes Heavy Flow | June 27 | 58 |
| Unfavorable Market Curtails Drilling in North Texas... *By H. H. King* | Aug. 1 | 143 |
| Takings from North Texas Wells Cut to 12 Barrels Each | Sept. 9 | 67 |
| Efforts are Renewed to Obtain Co-operation in North Texas | Dec. 5 | 78 |

## WEST TEXAS

### Glasscock County

| | | |
|---|---|---|
| Howard-Glasscock Leases on Part Payment Plan | July 25 | 56 |
| Howard-Glasscock Production Prorated Downward | June 6 | 56 |
| Reduced Pipe Line Takings Cut Howard-Glasscock Output | Aug. 1 | 223 |
| Shallow Production in Howard-Glasscock Area to be Prorated | Sept. 5 | 61 |

### Judkins

| | | |
|---|---|---|
| Judkins Area Threatens Big Flush with no Control in Sight | Feb. 21 | 57 |
| Judkins Field Will Have Four Pipe Lines | Feb. 28 | 40 |
| Judkins Wells Pinched Pending Completion of Pipe Lines | Feb. 28 | 53 |
| Judkins Production Reduction Lifted with Line Completions | March 7 | 64 |
| Judkins Field to be Active; No Curtailment in Prospect | March 14 | 234 |
| Judkins Field Extended Mile South | March 21 | 66 |
| Judkins Production Increasing with Four Lines Waiting | April 4 | 55 |
| Judkins Lease Deal Means Orderly Development | April 11 | 55 |
| Judkins Lack of Outlet May Force Proration of Output | May 2 | 88 |
| Judkins Field Proration Order Passed to Commission | June 27 | 57 |
| Judkins Production Cut 5000 Barrels August 1 | July 25 | 67 |
| Judkins Output Limited to 10,000 Barrels by Lack of Market | Aug. 1 | 213 |
| Judkins Field Production Boosted by 1750 Barrels Daily | Sept. 5 | 85 |

### Yates

| | | |
|---|---|---|
| Yates Prorated Output Reduced Another 10,000 Barrels. | July 4 | 63 |
| Further Curtailment of Yates Output Agreed | Dec. 5 | 79 |

### Wildcats and Miscellaneous

| | | |
|---|---|---|
| Ector County Area Promises Much Activity for New Year | Jan. 3 | 55 |
| Wheat Field, Loving County, Extended Mile East | Jan. 17 | 53 |
| Good Producer Enhances Ector County Prospects | Jan. 24 | 54 |
| West Texas Wildcat Discoveries Mark Possible Important Field | Jan. 31 | 130 |
| Taylor-Link Field Extended Two Directions by Flowing Wells | Jan. 31 | 194 |
| Three Big Lake Deep Tests Making Progress | Jan. 31 | 195 |
| Hendrick Field Has Big Lead in Total Recovery in West Texas | Jan. 31 | 196 |
| Ector County Becomes Next Big Potential West Texas Field | Feb. 7 | 54 |
| Ector County Gets Another Well and Ten More Locations | Feb. 14 | 67 |
| Another West Texas Well Makes Depth Record | Feb. 21 | 52 |
| Test for Gas in Stephens County Yields Oil | Feb. 28 | 66 |
| Ector County Assuming Place as Important Drilling Center | Apr. 18 | 55 |
| Western Crane County Wildcat Shows Favorably | Apr. 25 | 53 |
| Andrews County Test Nearing Production Level | May 16 | 67 |
| Crane County Wildcat Looks Good for Production | May 23 | 51 |
| New Well Producing Oil and Gas From Big Lake Deep Sand | May 30 | 49 |
| West Texas Buyers Restrict Runs 50 Per Cent in Some Fields | June 6 | 55 |
| Andrews County Wildcat Shows Prospects of Production | July 4 | 61 |
| West Texas Field Work Hits Big Slump | July 11 | 69 |
| Deep Production at Big Lake Give Substantial Boost | July 18 | 63 |
| Field Development is Orderly in West Texas During Last Year *By H. H. King* | Aug. 1 | 138 |
| West Texas Discovery Well Table | Aug. 1 | 139 |
| West Texas Has 303 Dry Holes During Past Year *By H. H. King* | Aug. 1 | 142 |
| West Texas Dry Hole Record for Past 12 Months *By H. H. King* | Aug. 1 | 145 |
| Andrews County Gas Flow May Mark New West Texas Field | Aug. 8 | 63 |
| Gasser Opens New Field for Andrews County | Aug. 15 | 58 |
| New Depth Record for Production in Big Lake Field | Aug. 22 | 70 |
| Ector-Andrews County Area Has Two Prospects for New Fields | Sept. 5 | 60 |
| North Ector County Producer Opens New Area | Sept. 12 | 89 |
| Ector County Wildcat May Open New West Texas Pool | Sept. 19 | 79 |
| Gulf Well in Ward County Promises Best Production in Area | Sept. 26 | 70 |
| World's Second Deepest Oil Well Completed at Big Lake | Oct. 10 | 179 |
| Crane County Producer Ushers in West Texas Field | Oct. 10 | 179 |
| Ward County Semi-Wildcat Well Is Good Producer | Oct. 17 | 67 |
| West Texas Area Restored to Favor by Crane Strike | Oct. 17 | 68 |
| Western Crane County Wildcat to Be Deepened | Oct. 24 | 70 |
| Big Lake Wells Increase Flow Against Back Pressure | Oct. 31 | 60 |
| Andrews Wildcat's Prospects Dampened by Sulphur Water | Nov. 7 | 111 |
| Four New Wells in Gulf-O'Brien Area Widely Separated | Nov. 21 | 77 |
| Gas Yield Reduced in Big Lake Deep Wells | Nov. 28 | 77 |
| Four Flowing Wells Completed in Burkett Pool | Nov. 28 | 78 |
| Andrews County Wildcat Increases Flow Following Shots | Nov. 28 | 78 |
| Two Big Lake Deep Wells Have Been Tubed | Dec. 5 | 79 |

## EAST CENTRAL TEXAS

### Van Field

| | | |
|---|---|---|
| Van Operating Committee Starts Additional Tests | Jan. 10 | 50 |
| Wildcat Work in Van Area Continues to Increase | Jan. 17 | 54 |
| Van Test Finds Formations Lower Than Original Wells | Jan. 24 | 55 |
| Van Field Important Development in Texas During Year *By H. H. King* | Jan. 31 | 127 |
| Locations by "Outsiders" Not to Disrupt Van Plan | Jan. 31 | 196 |
| Van Extension Indicates Area of Important Proportions | Feb. 7 | 56 |
| Successful Completions at Van Require More Offsets | Feb. 14 | 68 |
| Van Production to West Found Deeper; More Wells Start | Feb. 21 | 59 |
| Two More Producers Send Production to New Peak | Feb. 28 | 54 |
| Lease Requirements Keeping Van Drilling Active | Mar. 21 | 67 |
| Van Success Encourages East Central Texas Campaign | Mar. 28 | 58 |
| Van Completions Extending Area Showing Favorably | Apr. 4 | 55 |
| Favorable Progress Made of Van Field Outlet | May 2 | 91 |
| Unit Operated Van Field Has 20 Rigs and More Coming | May 9 | 54 |
| Van Field Extended 2000 Feet to Northeast | May 16 | 68 |
| Congestion Forces Cut of Van Production | May 30 | 50 |
| Production of 500 Barrels Per Well Allowed at Van | June 6 | 57 |
| Plan Second Unitized Area for Development East of Van | June 13 | 36 |
| Van Production Extended Beyond Unitized Area | June 20 | 60 |
| Van Extension Beyond Unitized Area Still in Doubt | June 27 | 58 |
| Van Extension Precipitates Move for Second Unit Agreement | July 4 | 62 |
| Van Field Drilling Program Halted by Water Shortage | July 25 | 66 |
| Drilling at Van Completed After Complete Shut-Down | Aug. 1 | 216 |
| Second Flowing Well Outside Van Unitized Area | Aug. 8 | 63 |
| Third Producer Outside Van's Unitized Area Completed | Aug. 29 | 75 |
| Four Companies Organizing Forces to Drill Outside Van Unitized Area | Sept. 5 | 85 |
| Complete 12,000 Barrel East of Van Unitized Area | Sept. 19 | 80 |
| Van Field Advisory Committee Named by Commission | Sept. 26 | 70 |
| Van Production Area Extended North, South and West | Oct. 3 | 186 |
| Van Has 750,000 Barrels Daily Potential on First Anniversary | Oct. 10 | 163 |
| Van's Activity Promises Increase in Production Allowance | Nov. 28 | 79 |
| Seven New Van Locations Ordered Drilled | Dec. 5 | 80 |
| Seven New Locations Ordered for Van Field | Dec. 26 | 58 |

### Wildcats and Miscellaneous

| | | |
|---|---|---|
| Mexia-Corsicana Area Has Low Rate of Decline in 1929 *By H. H. King* | Jan. 31 | 135 |
| Wildcat Work in East Texas Becoming More Active | Apr. 11 | 56 |
| LaRue Structure Promises Oil Strike in Henderson County | Apr. 25 | 54 |
| Wildcat Drilling Block in Shelby County | July 4 | 67 |
| Rusk County Wildcat Presages New Field in East Texas | Sept. 12 | 87 |
| Wildcat Well Establishes Production in Rusk County | Oct. 10 | 180 |
| Rusk County Wildcat Well's Output Shows Good Increase | Oct. 17 | 67 |
| Push Exploration of Drilling Blocks in Rusk County | Oct. 24 | 70 |
| Tests Drilling Near Joiner Well Reach Interesting Depths | Nov. 7 | 113 |
| Joiner Future Depends on Pending Completions | Nov. 14 | 77 |
| Joiner Area Records Two Failures During Week | Nov. 21 | 79 |
| Wildcat Activity in Eastern Texas Counties on Increase | Nov. 21 | 80 |
| Three East Texas Wildcats Are Closely Watched | Nov. 28 | 79 |
| Oil Show in Two Tests Revives Interest in Joiner Area | Dec. 5 | 80 |
| Henderson County Test Revives Interest in That Area | Dec. 12 | 71 |
| Test of Polk County Well Shows Favorably | Dec. 12 | 70 |
| Joiner Area to Be Scene of Intensive Development | Dec. 19 | 75 |
| Second Oil Area in Rusk County Appears Likely | Dec. 26 | 58 |
| Shelby County Test Is Abandoned | Dec. 26 | 59 |

## SOUTH TEXAS

### Darst Creek

| | | |
|---|---|---|
| Drilling Delays Lower Darst Potential on First Gauge | Jan. 3 | 61 |
| Darst Drilling Active With No Added Line Outlet | Jan. 10 | 62 |
| Darst Creek Potential Gauge Shows 30,988 Barrels | Jan. 17 | 58 |
| Darst Potential Up 50 Per Cent on February 1 Gauge | Feb. 7 | 58 |
| Darst Creek Potential Up 50 Per Cent | Feb. 21 | 62 |

| | Date | Page |
|---|---|---|
| Darst Creek Production Above Prorated Allowance | Feb. 28 | 56 |
| Darst Creek Potential Increased to 113,000 Barrels | Mar. 7 | 69 |
| New Darst Well Could Produce Three Times Field's Prorated Allowance | Apr. 4 | 63 |
| Prolific Darst Creek Well Starts Five Offsets Drilling Fast | Apr. 11 | 59 |
| Production Sale Not to Affect Darst Creek Proration | Apr. 18 | 60 |
| Complete Two Offsets to Darst Record Producer | Apr. 25 | 58 |
| Expect Increase in Darst Creek Field Allowance | May 2 | 94 |
| Complete Two Prolific Wells in Fault at Darst Creek | May 23 | 56 |
| New Field in Prospect for Guadalupe County | May 30 | 56 |
| Darst Creek Potential Lower After Re-Gauging of Wells | June 6 | 59 |
| Prolific Well at Salt Flat; Guadalupe Wildcat Planned | June 13 | 61 |
| Darst Potential Is Down Despite New Completions | June 20 | 63 |
| Darst Well Average 200 Barrels Daily During May | June 27 | 60 |
| Darst Creek Limitation Under State Supervision | July 18 | 67 |
| Darst Creek Schedule Remains Unchanged Until August 1 | July 25 | 68 |
| Darst Creek Inverts U. S. Production Trend | Aug. 8 | 47 |
| Eleven Inside Tests to Start in Darst Creek Field | Sept. 5 | 63 |
| Darst Creek Active With 25 Operations Underway | Sept. 9 | 83 |
| Eight New Inside Wells Completed at Darst Creek | Sept. 26 | 72 |
| Rush Darst Completions Before Announcement of New Schedule | Oct. 3 | 189 |
| New Wells Boost Darst Creek Production 2000 Barrels | Nov. 7 | 118 |
| Darst Creek Production Again Within 30,000 Barrel Limit | Nov. 21 | 85 |
| Darst Production Still Above Daily Allowable | Nov. 28 | 82 |
| Darst Creek Field Down 5574 Barrels Daily | Dec. 5 | 83 |
| Water Encroachment Increases to 60 Per Cent at Darst Creek | Dec. 19 | 82 |

### Pettus

| | | |
|---|---|---|
| New Field Opened in Bee County; Find Follows Gas Development | Feb. 7 | 57 |
| Second Oil Producer at Pettus Starts More Tests Drilling | Mar. 14 | 233 |
| Bee County Wildcat Has Showing Two Miles from Pettus | Apr. 18 | 61 |
| Pettus Extension Well Makes Wet Gas | Apr. 25 | 64 |
| Complete Third Producer in Pettus Field | May 2 | 94 |
| Three Completions Raise Pettus Production to 2500 Barrels | May 9 | 59 |
| Bee County Wildcat Showing May Mean Pettus Extension | May 16 | 73 |
| Pettus Production Area Extended Three Miles West | May 30 | 53 |
| Wildcat Opens New Producing Spot in Bee County | June 6 | 61 |
| Two Pettus Wildcats Abandoned as Failures | June 13 | 60 |
| Pettus Field Extended Mile West; Town Lot Drilling Looms | June 20 | 63 |
| Wildcat Shows Promise Pettus Wide Producing Area | June 27 | 59 |
| Pettus Townsite Drilling Starts; 25 Rigs Active in Field | July 4 | 65 |
| Pettus Producing 3889 Barrels from Nine Wells | July 11 | 76 |
| Pettus Operators Agree to Hold Production in Check | July 18 | 68 |
| Two new Producers Completed at Pettus; Two Near Completion | July 25 | 70 |
| Cosden's McKinney 2 Sets Record for Pettus | Aug. 1 | 218 |
| Pettus Is Center of Play Along Gulf Coast<br>*By Jack Logan* | Aug. 8 | 26 |
| Pettus Leads Gulf Coast Fields With Five Completions | Aug. 29 | 77 |
| Pettus Field's Daily Production Averages 8250 Barrels | Sept. 19 | 83 |
| Two Producers Completed in Pettus Townsite Area | Oct. 17 | 71 |
| Pettus Production to Remain at 4500 Barrels | Oct. 31 | 63 |
| Pettus' Potential on Official Gauge Shows 11,408 Barrels | Nov. 7 | 118 |
| Potential Production at Pettus Shows Decline | Dec. 12 | 75 |
| Ray-McKinney District Extended Three Miles North | Dec. 19 | 84 |
| Pettus Field Extended Northeast Three Miles | Dec. 26 | 61 |

### Refugio

| | | |
|---|---|---|
| Refugio Oil Production Increasing Steadily | Jan. 10 | 63 |
| New Pipe Line Outlet Increases Movement of Refugio Crude | Jan. 31 | 200 |
| Refugio Given Extension; Production Increases Continue | Feb. 14 | 71 |
| Refugio Production Still Climbs; Line Outlet Increased | Feb. 21 | 60 |
| Refugio Area Extended Two Miles to Northeast | Feb. 28 | 57 |
| Deep Well Extension of Refugio Field Increases Flow | Mar. 7 | 67 |
| Refugio Passes 40,000 Barrels Daily; Still Climbing | Mar. 21 | 68 |
| Nine New Producers Increase Refugio Production | Mar. 28 | 61 |
| Refugio Crude Given Price Raise With Gravity Schedule | Apr. 4 | 60 |
| Chief Interest at Refugio in Tests Over Mile in Depth | Apr. 11 | 58 |
| Refugio Production Shows Decline from Recent Peak | Apr. 18 | 59 |
| Two Wells Increase Refugio Deep Producers to Even Dozen | Apr. 25 | 58 |
| Refugio Represents New Type Oil Field for South Texas | May 2 | 49 |
| Many Completions and Deep Tests Mark Refugio Activity | May 9 | 59 |
| Refugio Deep Sand Apparently Extends Westward | May 16 | 72 |
| Deep Drilling Is Assuming Large Proportions at Refugio | May 23 | 55 |
| Interest at Refugio Still Centers Around Deep Tests | June 13 | 59 |
| Two 5500-Foot Wells at Refugio | June 20 | 64 |
| Wild Well Halts Refugio Business and All Adjacent Drilling | July 4 | 67 |
| Failures Dampen Ardor for Deep Drilling at Refugio | July 11 | 77 |
| Decline of Production at Refugio Continues, New Wells Added | July 18 | 65 |
| Wild Gas Well in Refugio Field Still Uncontrolled | Aug. 1 | 219 |
| Wild Refugio Gasser Quiets Down After Cratering | Aug. 8 | 68 |
| Five Completions Add 1000 Barrels to Refugio Output | Sept. 19 | 82 |
| Refugio Threatened by High Pressure Gas Well | Oct. 31 | 62 |
| Complete Three Wells in Deep Sand at Refugio | Nov. 28 | 83 |
| Refugio Field Is Extended One-Half Mile East | Dec. 5 | 83 |
| Refugio Adds 350-Barrel Well During Week | Dec. 26 | 56 |

### Wildcats and Miscellaneous

| | | |
|---|---|---|
| Chapman Field Development Slowed Down by Lack of Outlet | Jan. 13 | 28 |
| Serpentine Production from New Area in Williamson County | Jan. 24 | 59 |
| Chapman Market Outlet Ready About June 5 | June 6 | 57 |
| Chapman Field Market Outlet Provided | July 4 | 74 |
| Live Oak County Wildcat Promises Production | July 18 | 70 |
| Mirando Section of Southwest Texas Attracts Attention | Aug. 1 | 219 |
| Chapman Completions Raise Daily Output to New High Level | Aug. 1 | 232 |
| Dozen Important Tests Underway in Laredo District | Aug. 8 | 70 |
| Second Gasser Completed in Western Nueces County | Aug. 15 | 60 |
| Oil Production in Saxet Field Adds New South Texas Area | Aug. 22 | 73 |
| Three New Locations in Saxet Area, Nueces County | Sept. 12 | 91 |
| New Producing Area for Duval County Promised | Sept. 19 | 83 |
| Fourth Oil Producing Pool Is Opened in Bexar County | Oct. 24 | 74 |
| Live Oak County Completion Delayed by Heavy Pressure | Oct. 31 | 63 |
| Activity Resumed at Chapman as Water Shortage Ends | Oct. 31 | 65 |
| White Point Field May Become Oil Producing Area | Nov. 21 | 85 |
| Salt Flat Allowable Fixed at 15,333 Barrels Daily | Nov. 21 | 86 |
| Matagorda County Well to Be Drilled Deeper | Nov. 28 | 82 |
| Duval County Wildcat Still Flowing 195 Barrels Daily | Nov. 28 | 83 |
| Kerr County Promises New Production for South Texas | Dec. 5 | 84 |
| First Well for Jim Wells County Completed | Dec. 5 | 84 |
| Government Wells Area Extended 1½ Miles South | Dec. 5 | 84 |
| White Point Discovery Well Flowing 124 Barrels Daily | Dec. 5 | 84 |
| Deepen Duval County Well After Testing Salt Water | Dec. 12 | 76 |
| Travis County Well Reported Producing from Serpentine Formation | Dec. 19 | 63 |
| New Kerr County Area Active Following Successful Tests | Dec. 19 | 76 |
| Oil Production Established in Agua Dulce Field | Dec. 19 | 88 |
| Gas, Spray of Oil, Opens New Area in Southwest Texas | Dec. 26 | 61 |
| Kerr County Well Attracts Wide Interest | Dec. 26 | 62 |

## TEXAS GULF COAST

*(See also Louisiana Gulf Coast)*

### Barbers Hill

| | | |
|---|---|---|
| Deepest Producer at Barbers Hill Brings Largest Flow | Jan. 10 | 59 |
| New Deep Producer at Barbers Hill Increases Flow | Jan. 17 | 58 |
| Barbers Hill Deep Test Still Holding Up Production | Jan. 24 | 58 |
| Barbers Hill Deep Well Holding Up Production | Jan. 31 | 199 |
| Barbers Hill Deep Producer Holds Initial Production 30 Days | Feb. 7 | 55 |
| Barbers Hill Deep Producer Declines Slightly | Feb. 14 | 71 |
| Barbers Hill Deep Well Still Flowing 5000 Barrels | Feb. 28 | 58 |
| Barbers Hill Deep Sand Well Still Holding Up | Mar. 7 | 68 |
| Deep Sand Development at Barbers Hill<br>*By P. S. Murphy and Sidney A. Judson* | Apr. 4 | 25 |
| Barbers Hill Test Nearing Level of Deep Production | Apr. 4 | 56 |
| Barbers Hill Deep Area Extended West | Apr. 25 | 60 |
| Barbers Hill Wildcat Test Drilling at 6590 Feet | May 2 | 92 |
| New Depth Record Made at Barbers Hill | May 23 | 54 |
| Wells Point to Deep Production on All Sides of Barbers Hill<br>*By Jack Logan* | May 30 | 25 |
| Barbers Hill Interest Centers on West Side Deep Test | June 6 | 58 |
| Well Flows Over 600,000 Barrels in Five Months at Barbers Hill | June 13 | 60 |
| Barbers Hill Most Active South Texas Area; Deep Test Due | June 27 | 61 |
| Barbers Hill Well Jumps from 300 to 6000 Barrels Daily | July 25 | 68 |
| New Wells at Barbers Hill Have Large Initial Flow | Aug. 1 | 218 |
| West Flank at Barbers Hill Proved for Oil Production | Aug. 29 | 77 |
| Barbers Hill Well Penetrates Cap Rock and Salt to Pay Sand | Oct. 10 | 182 |
| Complete Another Sub-Salt Dome Well at Barbers Hill | Oct. 31 | 62 |
| Another Barbers Hill Well Completed Through Salt | Dec. 5 | 83 |
| Barbers Hill Well Makes Record Depth Through Salt | Dec. 19 | 84 |
| New Deep Sand Opened at Barbers Hill | Dec. 26 | 63 |

### Humble

| | | |
|---|---|---|
| Deep Sand Development Opens New Possibilities for Humble Field<br>*By Jack Logan* | Jan. 17 | 27 |
| Humble Townsite Well Makes 1500 Barrels from Deep Sand | Jan. 31 | 199 |
| Humble Deep Producer on West Side Increases Production | Feb. 7 | 58 |
| Humble Deep Tests Prove Disappointing | May 2 | 92 |
| Two Producers and One Failure for Humble | July 25 | 69 |

### Wildcats and Miscellaneous

| | Date | Page |
|---|---|---|
| State Offering Submerged Nueces Bay Leases | July 4 | 66 |
| Deepest Producing Well of Gulf Coast | Jan. 10 | 61 |
| Humble Gets First Commercial Well on Moss Bluff Dome | Jan. 10 | 61 |
| Production Below 5000 Feet in 17 Gulf Coast Fields — *By Richard A. Jones* | Jan. 24 | 27 |
| Deep Drilling Around Old Domes Boosts Gulf Coast Recovery — *By Jack Logan* | Jan. 31 | 141 |
| Brooks County Discovery Well Flows 200 Barrels Oil With Gas | Feb. 7 | 57 |
| Gulf Coast Records 44 Completions Past Week | May 9 | 60 |
| Prolific Producer Completed at North Dayton | May 30 | 56 |
| Esperson Dome Test Promises Production at New Depth | June 6 | 58 |
| Test on South Flank at North Dayton Is Failure | June 13 | 59 |
| North Dayton Well Still Producing 2400 Barrels | June 20 | 63 |
| Esperson Dome Deep Test to Drill Plug | June 20 | 64 |
| North Dayton Deep Well Flowing 2000 Barrels | July 4 | 66 |
| Second Oil Producer at Moss Bluff | July 11 | 77 |
| Nueces County Wildcat Gasser Runs Wild | July 11 | 77 |
| Esperson Dome Deep Test Fails to Flow; Will Deepen | July 18 | 66 |
| Older Fields in Texas Coast Area Have Active Week | Aug. 8 | 68 |
| Raccoon Bend Field Extended Across Brazos Into Waller County | Aug. 15 | 60 |
| Esperson Dome Gasser Sets New Gulf Coast Depth Record | Sept. 5 | 62 |
| Drilling in Progress on Three Sides of Moss Bluff Dome | Sept. 19 | 84 |
| North Dayton Gets Good Producer from Workover | Sept. 26 | 72 |
| Stratton Ridge Dome Test Penetrates Cap Rock Into Salt | Sept. 26 | 73 |
| First Important Oil Strike Made at Mykawa, Harris County | Oct. 10 | 189 |
| Texas Gulf Coast Completions Register Decline During Week | Oct. 31 | 63 |
| Matagorda County Has Two Interesting Developments | Dec. 12 | 75 |
| Bloomington Test in Victoria County Is Abandoned | Dec. 12 | 76 |
| Moss Bluff Extended 2500 Feet Northward | Dec. 19 | 82 |

### Washington

| | | |
|---|---|---|
| Several Tests for Oil in Washington | July 25 | 76 |

### Wyoming

| | | |
|---|---|---|
| Ohio Oil Company Opens New Field Near Cody | Mar. 21 | 74 |
| Osage Deep Development to Be Active During Summer | Mar. 28 | 67 |
| Osage Extension Well Comes in for 200 Barrels | June 6 | 90 |
| Prove Tensleep Sand at Little Lost Soldier Field | June 20 | 66 |
| Get Through Gas Sand in Sand Draw Test | June 20 | 92 |
| Government Offering Lands in Park County, Wyoming | July 4 | 80 |
| Oregon Basin Leases to Be Sold | July 18 | 80 |
| Two Wyoming Deep Tests Hold Interest | Aug. 1 | 280 |
| Oil Show in Second Wall Creek Sand at Midway Dome | Aug. 8 | 76 |
| Midway Dome Test Believed Opening Important Wyoming Light Oil Area | Sept. 5 | 82 |
| Plan Production Test at Midway Dome | Sept. 5 | 82 |
| Interesting Tests Are Planned in Wyoming | Sept. 12 | 97 |
| Discover Shallow Pool in Southwestern Wyoming | Sept. 12 | 98 |
| Complete Large Well in Sundance Sand at Lance Creek Field | Oct. 24 | 82 |
| New Field Proven in Park County, Wyoming | Dec. 5 | 82 |
| Salt Creek Well Has Tested All Formations | Dec. 5 | 82 |
| Seek to Sidetrack in Park County, Wyoming, Test | Dec. 12 | 72 |


# Maps


### FOREIGN

| | | |
|---|---|---|
| World Map of Leigh Itinerary | Jan. 31 | 67 |
| Iraq Field | Jan. 31 | 179 |
| Caribbean Region | Feb. 21 | 67 |
| North German Plain | May 23 | 24 |
| Showing Search for Oil in Western Canada | July 4 | 40 |
| Northern Mexico (Special Insert) | Dec. 5 | |
| Northern Mexico—State of Coahuila | Dec. 12 | 33 |

### DOMESTIC

| | | |
|---|---|---|
| Lea Pool, New Mexico | Jan. 3 | 58 |
| Muskegon Field, Michigan | Jan. 10 | 27 |
| Oklahoma City Pool, Oklahoma | Jan. 10 | 51 |
| Barbers Hill Dome, Chambers County, Texas | Jan. 10 | 60 |
| Humble Field, Harris County, Texas, Ownership (Special Insert) | Jan. 17 | |
| McPherson, Harvey and Sedgwick Counties, Kansas | Jan. 31 | 80 |
| California—Principal Proven Fields Developed During 1929 | Jan. 31 | 120 |
| California—Lost Hills and South Dome of Kettleman Hills | Feb. 14 | 75 |
| Florida | Feb. 21 | 34 |
| Earlsboro Field, Oklahoma | Feb. 21 | 56 |
| Judkins Field, Texas | Feb. 21 | 57 |
| Woods County, Oklahoma | Feb. 28 | 37 |
| Woodward County, Oklahoma | Feb. 28 | 37 |
| Western Public Service Corporation—Natural Gas System | Mar. 14 | 82 |
| Refugio Field, South Texas (Special Insert) | May 2 | |
| Darst Creek, Guadalupe County, Texas | May 23 | 70 |
| Barbers Hill Dome, Chambers County, Texas | May 30 | 27 |
| Hobbs Field, New Mexico | June 6 | 27 |
| Western Kansas | June 13 | 25 |
| Chapman Field, Williamson County, Texas | June 13 | 29 |
| Oklahoma City Field, Oklahoma (Special Supplement) | Aug. 1 | |
| Wanette Pool, Oklahoma | Sept. 5 | 44 |
| Hugoton Gas Area, Kansas, With Reference to Amarillo District | Sept. 26 | 30 |
| Gulf Coast Salt Domes (Special Insert) | Oct. 3 | |
| Elk Hills Naval Petroleum Reserve | Nov. 21 | 90 |
| United Gas System's Line, Kirbyville, Texas, to Franklin, Louisiana | Dec. 12 | 63 |
| Haynesville, Louisiana, Area, Showing Repressuring Project | Dec. 19 | 29 |
| Jackson, Mississippi, Gas Area | Dec. 26 | 30 |
| Kerr County, Texas, With Reference to Other Producing Fields | Dec. 26 | 62 |


# Pipe Lines and Transportation

## CONSTRUCTION NEWS

(See Also Engineering Classification for Other Date)


### GENERAL

| | | |
|---|---|---|
| The Year in Traffic and Transportation | Mar. 14 | 67 |
| Community Life at a Pipe Line Station — *By George Reid* | Aug. 8 | 30 |
| Five Major Pipe Line Projects Under Way in Mid-Continent | June 13 | 64 |

### FOREIGN

| | | |
|---|---|---|
| Iraq Directors to Select Pipe Line Route | Jan. 31 | 179 |
| First Arc Welded Pipe Line in Mexico | Feb. 28 | 84 |
| In South American Fields Transportation is Largely a Matter of Rolling Your Own | Mar. 14 | 99 |
| Pipe Line to Be Built From Vera Cruze to Mexico City | June 27 | 74 |
| Pipe Lining in the Tropics | July 4 | 38 |
| To Build Las Palmas Pipe Line | Oct. 7 | 41 |
| Mexican Eagle's Pipe Line | Oct. 31 | 39 |

### DOMESTIC

#### Gas Lines

| | | |
|---|---|---|
| Natural Gas Line Work in North Texas During 1929 | Jan. 31 | 216 |
| Cities Service to Take Oklahoma City Gas | Feb. 14 | 65 |
| Long Line Across Texas Modern in Construction | Mar. 14 | 64 |
| Extensive Gas Line Construction in Rocky Mountain Area | Mar. 14 | 81 |
| Missouri-Kansas Holdings and Service in Kentucky Extended | Apr. 4 | 66 |
| Pacific Coast Communities Have Natural Gas | Apr. 11 | 94 |
| Survey for Line From Panhandle to Omaha | Apr. 25 | 66 |
| New 950 Mile Gas Tank Line Proposed | Apr. 25 | 66 |
| Start Work on 300 Mile Gas Line in New Mexico | May 2 | 98 |
| Three Lines From Panhandle to Mid-West Getting Underway | May 9 | 39 |
| Cities Service Line to Sedalia, Missouri | May 9 | 63 |
| Gas Pipe Line Authorized | May 9 | 66 |
| Plans for Three Natural Gas Lines to Midwest Go Forward | May 23 | 62 |
| Additional Gas Lines Under Construction | May 30 | 67 |
| Two Lines to Expand Houston Natural Gas System | June 13 | 62 |
| Line Will Take Louisiana Gas to Mississippi and Alabama | June 27 | 66 |
| Missouri-Kansas Rushing Work on Long Line | June 27 | 66 |
| Work Progressing on Gas Supply for New Mexico | June 27 | 79 |
| First Contracts for 1000 Mile Gas Pipe Line Are Let | July 25 | 32 |
| Cities Service Constructing New Gas Line to Extend Service | July 25 | 51 |
| Plan Gas Line from Boggy Creek to Huntsville | Sept. 5 | 63 |
| Plan Gas Pipe Line from Cut Bank Field to Seattle | Sept. 12 | 97 |

| | Date | Page |
|---|---|---|
| Two Gas Lines Planned as Market Outlets for Big Lake Field | Nov. 7 | 96 |
| Purchase of Southern Natural Gas Line is Rumored | Nov. 28 | 86 |
| Plan Gas Line from Kirbyville, Texas, to Franklin, Louisiana | Dec. 12 | 63 |
| Missouri-Kansas May Tap Midwest Markets With Line | Dec. 19 | 87 |

## Gasoline Lines

| | | |
|---|---|---|
| Magnolia Building Line to Move Gasoline | Mar. 21 | 66 |
| Magnolia Tests Gasoline Line | July 25 | 56 |
| North Texas Refiners Lay Plans for Gasoline Line to Gulf Coast | Nov. 7 | 94 |

## Oil Lines

| | | |
|---|---|---|
| Texas-Empire Line to Chicago Another Welding Achievement | Jan. 3 | 28 |
| Shell Purchase of Taylor-Link Pipe Line Offers Relief | Jan. 10 | 55 |
| Pipe Line Construction in California During 1929 | Jan. 31 | 63 |
| Review of Pipe Line Construction in Central Texas<br>*By H. H. King* | Jan. 31 | 128 |
| Pipe Lines Constructed in Gulf Coast and South Texas During 1929 | Jan. 31 | 216 |
| Refugio Field Given More Line Outlet | Feb. 7 | 42 |
| Line to Judkins | Feb. 21 | 52 |
| Start Construction of Pipe Line from Van Field to Coast | Mar. 7 | 59 |
| Texas-Empire Line Capacity Increased by Nine New Stations | Mar. 7 | 19 |
| California Line Builders Were Busy Last Year<br>*By Brad Mills* | Mar. 14 | 75 |
| Important Texas Line Projects Completed in Recent Months | Mar. 14 | 77 |
| Pure Starts Line to Serve Van Field | Mar. 14 | 78 |
| Empire Rumored Planning Line to Channel Site | Mar. 14 | 78 |
| Humble Starts Construction on Line to Refugio | Mar. 14 | 79 |
| Oil Pipe Line Construction at Low Ebb in Louisiana-Arkansas | Mar. 14 | 80 |
| Little New Pipe Line Work in Oklahoma-Kansas<br>*By Warren Baker* | Mar. 14 | 87 |
| Mud is South Texas' Impediment to Line Construction | Mar. 14 | 235 |
| Two Pipe Lines Serving New Borger Field | Mar. 14 | 252 |
| Gulf Building Line to Serve Hankamer | Mar. 28 | 62 |
| Humble Enters Humble Field with Four-Inch Pipe Line | Apr. 4 | 62 |
| New Hearing Announced on Proposed Line to Yates Field | Apr. 4 | 88 |
| Williamson County Field Gets Two Pipe Lines | May 9 | 44 |
| Plan Maverick Pipe Line | May 16 | 95 |
| Gulf Building Additional Line Outlet for Darst Creek | May 30 | 52 |
| Speculation on Ajax Connections by Mid-Continent Observers | May 30 | 60 |
| Standard Man Heads Ajax Line | June 13 | 65 |
| Shell Rushing Work on Line to Serve Hobbs Area | June 20 | 61 |
| Gulf Line, Oklahoma East, Will Serve New Refineries | June 20 | 25 |
| Map of Sinclair and Prairie Lines from Texas to Great Lakes | July 25 | 33 |
| Magnolia May Extend West Texas Line | July 25 | 51 |
| Start Work on Union Gulf Line to Eastern Points | July 25 | 51 |
| Plan Two Refineries and Pipe Line Relief from Chapman Field | July 25 | 69 |
| Pipe Line Construction in 1930, Actual and Proposed | Aug. 1 | 195 |
| Work Starts on Ajax Pipe Line at Five Separate Points | Aug. 1 | 226 |
| Magnolia Extends Pipe Line System in Oklahoma to Handle Burbank Oil | Aug. 22 | 74 |
| Texas Pipe Line Company Rushing Work on 20 Mile Parallel Line | Aug. 15 | 50 |
| Pettus and Refugio Outlet Lines Construction to Start Soon | Aug. 15 | 59 |
| Atlantic Pipe Line to Build Crude Extension | Sept. 12 | 89 |
| Humble Announces Pipe Line Connection for Pettus Field | Sept. 12 | 90 |
| New Line from Yates Field to Glenn Pool, Oklahoma, Likely | Sept. 26 | 69 |
| Texas Pipe Line Surrenders East Central Texas Crude Connections | Oct. 3 | 164 |
| Humble Line from Pettus to Coast Starts Operating | Oct. 10 | 182 |
| Magnolia to Complete Duval County Line October 20 | Oct. 24 | 74 |
| Line Facilities Now Available to New Castle-Orth District | Nov. 21 | 79 |
| Movement Through Ajax Line to Start Early in December | Nov. 28 | 62 |
| Second-10-Inch Line Outlet for Van Field Completed | Dec. 19 | 75 |
| Ajax Line Now Moving Crude from Mid-Continent | Dec. 26 | 54 |

*3301 Buffalo Drive*

**HOUSTON, TEXAS**

LEM, 32